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State of California Department of Transportation

**Materials Sampling, Field Testing
and Laboratory Testing Plan**

Strategic Highway Research Program

*SPS-8 Experimental Project
(Flexible and Rigid)*

Federal Aid Project No. ACNH-P099(370)Y

Sycamore Street

Merced County, California

FINAL

February 1999

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Materials Sampling, Field Testing and Laboratory Testing Plan SPS-8 Experimental Project Sycamore Street, Merced County, California

This document presents the materials and sampling plan for the experimental Strategic Highway Research Program (SHRP) SPS-8 project planned for construction on Sycamore Street near Delhi in Merced County, California.

Background

The LTPP SPS-8 experiment entitled, "Strategic Pavement Studies of Environmental Effects In the Absence of Heavy Loads", consists of the construction of two test sections with asphalt concrete (AC) surface layers and base layers of varying thickness, and two test sections of portland cement concrete (PCC) surface layers of varying thicknesses.

In the following portion of this document, tables of materials sampling, field tests and laboratory test quantities are presented. This is followed by a detailed presentation of the materials sampling, field testing and laboratory testing plan and requirements of the California SPS-8 project.

Sampling and Testing Quantities

The estimated quantities for materials sampling, field testing and laboratory testing for the SPS-8 experimental project are contained in tables 1 and 2. It should be noted that the SHRP sampling and test procedures referenced in these tables and in other portions of this document must be followed in conducting this work. This includes completion and submission of all required data forms.

Table 1. Estimated quantities of laboratory materials testing, SPS-8 California.

	<u>LTPP Test Designation</u>	<u>SHRP Protocol</u>	<u>No.</u>
NATURAL SUBGRADE			
Sieve Analysis	SS01	Ship to FHWA Lab	4
Hydrometer to 0.01 mm	SS02	Ship to FHWA Lab	4
Atterberg Limits	SS03	Ship to FHWA Lab	4
Classification and Type of Subgrade	SS04	Ship to FHWA Lab	4
Moisture-Density Relations	SS05	Ship to FHWA Lab	4
Resilient Modulus	SS07	Ship to FHWA Lab	4
Natural Moisture Content	SS09	Ship to FHWA Lab	4
Permeability	UG09	P48	1
In-Place Density		SHRP-LTPP Method	16
PREPARED EMBANKMENT			
Sieve Analysis	SS01	Ship to FHWA Lab	4
Hydrometer to 0.01 mm	SS02	Ship to FHWA Lab	4
Atterberg Limits	SS03	Ship to FHWA Lab	4
Subgrade Classification and Type	SS04	Ship to FHWA Lab	4
Moisture-Density Relations	SS05	Ship to FHWA Lab	4
Resilient Modulus	SS07	Ship to FHWA Lab	4
Natural Moisture Content	SS09	Ship to FHWA Lab	4
Permeability	UG09	P48	1
In-Place Density		SHRP LTPP Method	16
Expansion Index	SS12	P60	40
CLASS 2 AGGREGATE BASE			
Particle Size Analysis	UG01	Ship to FHWA Lab	4
Sieve Analysis (Washed)	UG02	Ship to FHWA Lab	4
Atterberg Limits	UG04	Ship to FHWA Lab	4
Moisture-Density Relations	UG05	Ship to FHWA Lab	4
Resilient Modulus	UG07	Ship to FHWA Lab	4
Classification	UG08	Ship to FHWA Lab	4
Permeability	UG09	P48	1
Natural Moisture Content	UG10	Ship to FHWA Lab	4
In-Place Density		SHRP-LTPP Method	16

Table 1. Estimated quantities of laboratory materials testing, SPS-8 California. (cont'd)

	<u>LTPP Test</u> <u>Designation</u>	<u>SHRP</u> <u>Protocol</u>	<u>No.</u>
ASPHALT CONCRETE SURFACE			
Core Examination/Thickness	AC01	P01	3
Bulk Specific Gravity	AC02	P02	3
Maximum Specific Gravity	AC03	P03	3
Asphalt Content (Extraction)	AC04	P04	3
Moisture Suceptibility	AC05	P05	3
Creep Compliance	AC06	Ship to FHWA Lab	1
Resilient Modulus	AC07	Ship to FHWA Lab	9
Indirect Tensile Strength	AC07	Ship to FHWA Lab	3
In-Place Density		SHRP-LTPP Method	6
EXTRACTED AGGREGATE			
Specific Gravity of Coarse Aggregate	AG01	P11	3
Specific Gravity of Fine Aggregate	AG02	P12	3
Type and Classification of Coarse Aggregate	AG03	P13	3
Type and Classification of Fine Aggregate	AG03	P13	3
Aggregate Gradation	AG04	P14	3
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3
ASPHALT CEMENT			
Abson Recovery	AE01	P21	3
Penetration @ 25°C, 46.1°C	AE02	P22	3
Specific Gravity @ 15.6°C	AE03	P23	3
Viscosity @ 25°C	AE04	P24	3
Viscosity @ 60°C, 135°C	AE05	P25	3
ASPHALT CEMENT (FROM PLANT)			
Penetration @ 25°C, 46.1°C	AE02	P22	3
Specific Gravity @ 15.6°C	AE03	P23	3
Viscosity @ 25°C	AE04	P24	3
Viscosity @ 60°C, 135°C	AE05	P25	3

Table 1. Estimated quantities of laboratory materials testing, SPS-8 California. (cont'd)

	<u>LTPP Test Designation</u>	<u>SHRP Protocol</u>	<u>No.</u>
PORTLAND CEMENT CONCRETE - AS DELIVERED			
Compressive Strength	PC01	P61	
14 day			3
28 day			3
1 year			3
Splitting Tensile Strength	PC02	P62	
14 day			3
28 day			3
1 year			3
Flexural Strength	PC09	P69	
14 day			3
28 day			3
1 year			3
Air Content	ASTM	C231	3
Slump	ASTM	C143	3
Temperature	ASTM	C1064	3
PORTLAND CEMENT CONCRETE - AS PLACED			
Compressive Strength	PC01	P61	
14 day			3
28 day			3
1 year			3
Splitting Tensile Strength	PC02	P62	
14 day			3
28 day			3
1 year			3
PCC Unit Weight	PC05	P65	9
Static Modulus of Elasticity	PC04	P64	
28 day			3
1 year			3
Core Examination and Thickness	PC06	P66	26
Air Content @ 28 days	PC08	P68	1
PCC Coefficient of Thermal Expansion	PC03	Ship to FHWA	1

Table 2. Estimated quantities for material sampling and other field tests, SPS-8 California.

	<u>Quantity</u>	<u>Units</u>
ASPHALT CONCRETE		
Coring (102mm diameter cores)	16	Cores
Bulk Sampling Mix (90 kgs)	3	Samples
Bulk Sampling Asphalt Cement (19-l Pails)	3	Samples
PORTLAND CEMENT CONCRETE		
Coring (102mm diameter cores)	26	Cores
Bulk Sampling Mix	3	Samples
AGGREGATE BASE		
Bulk Sampling (182 kg Samples)	4	Samples
Moisture Content Samples	4	Jars
PREPARED EMBANKMENT		
Splitspoon Sampling (Expansion Tests)	40	Samples
Bulk Sampling (227 kg Samples)	4	Samples
Moisture Content Samples	4	Jars
NATURAL SUBGRADE		
Bulk Sampling (227 kg Samples)	4	Samples
Moisture Content Samples	4	Jars
ELEVATION SURVEYS	30	Person-Hours
(5 person hours per section per layer, ~60 points/section/layer)		
SHIPPING TO FHWA LAB		
AC Cores	13	Cores
Bulk Dense Graded Aggregate Sample	3	136 kg Samples
Embankment Samples (Bulk)	3	136 kg Samples
Natural Subgrade Samples (Bulk)	3	136 kg Samples
SHIPPING TO SHRP MATERIALS REFERENCE LIBRARY		
AC Bulk Sample	3	19-l Pails (91 kgs)
Asphalt Cement Sample	3	19-l Pails
Bulk AC Aggregate Sample	1	227 kg Drum
Portland Cement Bulk Sample	2	19-l pails (60 kg)
Flyash Used in the Mixture	2	
Glass Containers of Liquid Additive		
Protected Against Breakage	2	1-l bottle

Sampling and Testing of SPS-8 Test Sections

Material sampling and testing on this project during construction includes the following measurements, tests and samples from the various construction stages:

Natural Subgrade

- Bulk sampling of the prepared natural subgrade surface
- Moisture content sampling of the prepared natural subgrade surface
- Moisture and density tests on the prepared natural subgrade surface
- Base line elevation surveys on the surface of the prepared natural subgrade to use as a reference in determining layer thickness

Prepared Embankment

- Bulk sampling of the prepared embankment
- Moisture content sampling of the prepared embankment
- Moisture and density tests on the prepared embankment surface
- Continuous splitspoon sampling to a depth of 6.1m
- Baseline elevation surveys on the surface of the prepared embankment to use as a reference in determining layer thickness
- Falling Weight Deflectometer (FWD) testing, performed by LTPP Regional Contractor

Dense Graded Aggregate Base

- Bulk sampling of the uncompacted dense graded aggregate base (DGAB)
- Moisture content sampling of the prepared DGAB surface
- Moisture and density tests on the prepared DGAB
- Elevation measurements on the prepared DGAB surface
- Falling Weight Deflectometer (FWD) testing, performed by LTPP Regional Contractor

Asphalt Concrete Surface

- Bulk sampling of the Asphalt Concrete (AC) materials (mixture, cement and aggregate)
- Coring of the AC for laboratory testing
- Density tests on compacted AC
- Elevation measurements on the prepared AC surface

Portland Cement Concrete Surface

- Bulk sampling of the portland cement concrete (PCC) materials (cement and aggregate)
- Bulk sampling of portland cement concrete (PCC) as delivered
- Coring of the PCC for laboratory testing
- Moulding of fresh PCC samples for lab testing
- Elevation measurements on the prepared PCC surface

The details for these samples, tests and measurements are presented in subsequent portions of this document organized by layer type.

The development of the materials sampling plan was based upon an assumed continuous construction sequencing. Significant time delays between the construction of the test sections may require changes to this sampling plan.

Referenced Documents

In addition to the appropriate AASHTO and ASTM standard methods and tests referenced in this document, the following SHRP-LTPP documents serve as reference material which contain greater details on the sampling and testing requirements and data forms.

SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing (PCC, Bituminous Materials, Aggregates and Soils), Operational Guide No. SHRP-LTPP-OG-004, Strategic Highway Research Program, November, 1989, (Revised January, 1992).

Specific Pavement Studies, Materials and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads, Operational Memorandum No. SHRP-LTPP-OM-030, Strategic Highway Research Program, August 1992.

SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling, Version 2.0, Operational Guide No. SHRP-LTPP-OG-006, Strategic Highway Research Program, May 1990.

Manual for FWD Testing in the Long Term Pavement Performance Study, Version 2.0, February 1993.

Test Section Layout

Figure 1 illustrates the ordering and combination of experimental test section pavement structures to be constructed. Construction stations are shown in this figure. Stylized transitions in the pavement structure are shown between the test sections. Transition details will depend upon construction sequence and practice.

The construction stationing and LTPP test section stationing for the location of the SPS-8 test sections are shown in table 3. Test section stationing refers to the method LTPP uses to reference locations within and adjacent to the ends of individual test sections. The LTPP test section stations are referenced with station 0+00 assigned to the beginning of the 152.4m monitoring portion of each test section, and station 1+52.4 at the end of the monitoring portion. In this table the six digit LTPP test section numbers are also shown. The six digit number is the official test section number for use on all data forms. The last two numbers of the six digit number correspond to the LTPP test section designation. *Please note that these numbers are changed from those in the plans.* The relevant design features of each test section are shown in this table.

The limit of each test section is defined in table 3 as the area between but including the destructive sampling areas. Each test section consists of three portions, the destructive testing areas, the monitoring testing area and the transitions. The destructive sampling areas are located immediately before and after the monitoring portion. These locations are listed in table 3, designated as the area between "begin and begin monitoring," and "end and end monitoring." The monitoring area is a 152.4m length within which no destructive testing on the surfacing is allowed. This monitoring area is designated as the area between the "begin monitoring" and "end monitoring" stations in table 3. Transition areas are those designated for the transition from differing materials, differing thicknesses or differing cross sections. No sampling, testing or monitoring will be performed within the transition areas. All changes in materials, thicknesses or properties should occur within the designated transition zones.

In general, all sampling of compacted material should occur outside of the monitoring portion but within the destructive sampling portions of the test section. The only samples and tests performed within the 152.4m monitoring portion are sampling of the subgrade material, elevation measurements, nuclear moisture-density tests and FWD measurements.

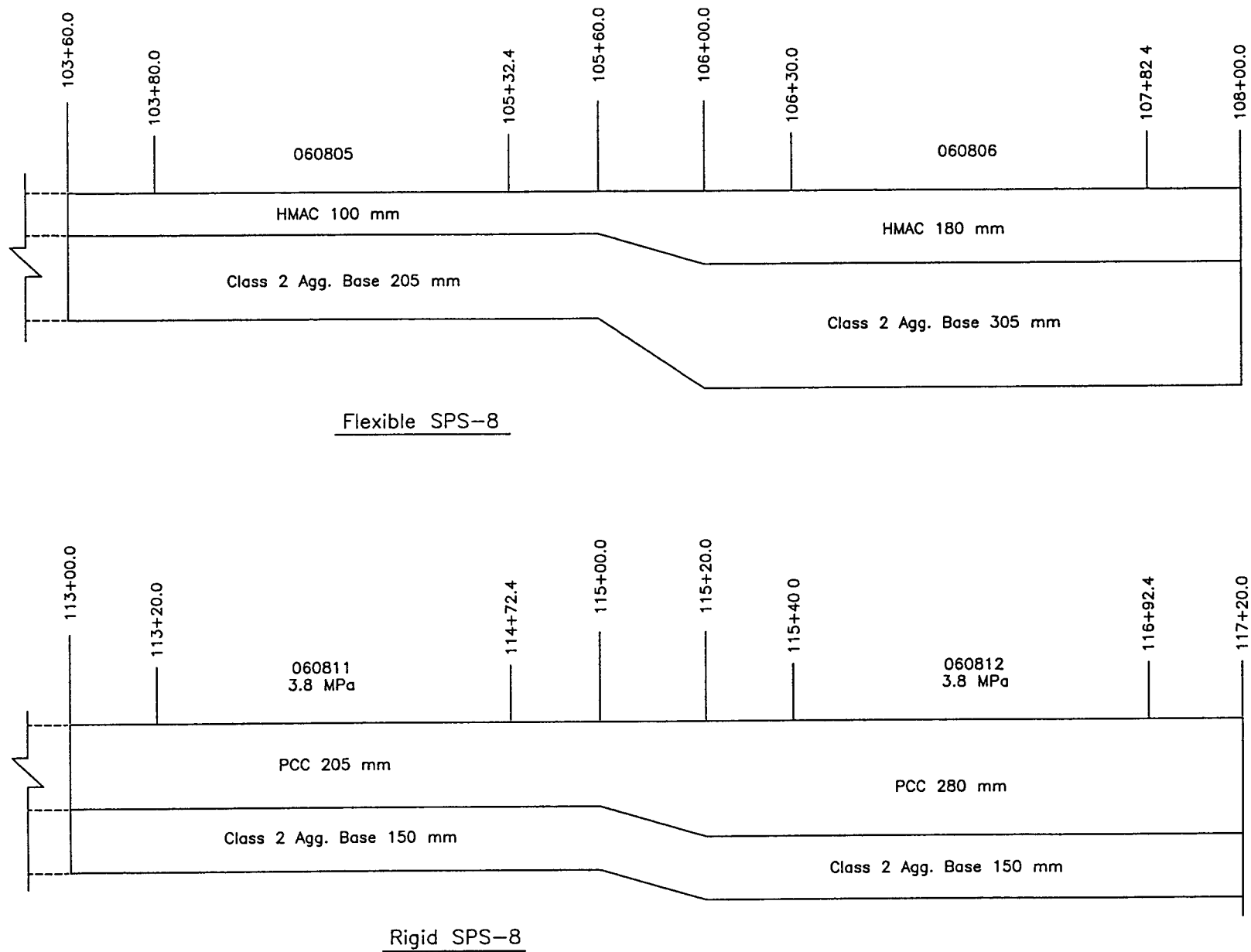


Figure 1. Layout of experimental test sections, California SPS-8 project
Sycamore Avenue

Table 3. Section location and project locations, Sycamore Street, SPS-8 California.

Site	Location	Construction Stationing	Test Section Stationing	Test Section
Transition		103+40 to 103+60		
060805	Begin	103+60	0-20	100mm HMAC 205mm CI2AB
	Begin Monitoring	103+80	0+00	
	End Monitoring	105+32.4	1+52.4	
	End	105+60	1+80	
Transition		105+60 to 106+00		
060806	Begin	106+00	0-30	180mm HMAC 305mm CI2AB
	Begin Monitoring	106+30	0+00	
	End Monitoring	107+82.4	1+52.4	
	End	108+00	1+70	
Transition		112+80 to 113+00		
060811	Begin	113+00	0-20	205mm PCC 150mm CI2AB
	Begin Monitoring	113+20	0+00	
	End Monitoring	114+72.4	1+52.4	
	End	115+00	1+80	
Transition		115+00 to 115+20		
060812	Begin	115+20	0-20	280mm PCC 150mm CI2AB
	Begin Monitoring	115+40	0+00	
	End Monitoring	116+92.4	1+52.4	
	End	117+20	1+80	

Overview of Sampling and Testing

An overview of the material sampling and testing to be performed on all test sections is shown in figures 2 through 5 for each pavement layer. In these figures, symbols are used to designate the locations for the various types of samples and tests. Bulk samples of AC test sections should be obtained during construction.

Although all sampling is to be performed by the state, the laboratory materials testing will be performed by both the state and the FHWA-LTPP Testing Contractor Laboratory. There are additional samples which will be collected for the SHRP Materials Reference Library as well. When instructed to "ship to FHWA lab" or "MRL samples" the following guidelines should be followed:

Ship to FHWA Lab

The FHWA contracted testing laboratory is:

Braun Intertec Testing
Attention: David Clauson
6801 Washington Ave. South
Minneapolis, Minnesota 55439
(612) 941-5600

Before shipping any material, Kevin Senn, State Coordinator Western Region Coordination Contractor (WRCOC) (775/329-4955) and David Clauson, Braun Intertec, (612/941-5600) should be notified of the planned shipment. Cost of shipping is a state requirement.

MRL Samples

The SHRP Materials Reference Library (MRL) is located in Sparks, Nevada and is operated under contract with the FHWA by Nichols Consulting Engineers, Chtd. The MRL will supply containers and provide shipping of the samples to Sparks, Nevada. Coordination for the containers and shipping should be directed to:

Nichols Consulting Engineers, Chtd.
Attention: Kevin Kawalkowski
1625 Crane Way
Sparks, Nevada 89431
(775) 358-7574 or (775) 329-4955

Natural Subgrade

The natural subgrade is defined as the natural existing material which underlies the embankment. Only clearing and grubbing normally occurs on this material. If the embankment is greater than 1.22m thick, then no samples or tests are required on the natural subgrade.

However, if this material is within 1.22m of the prepared embankment surface, then samples are required. If possible, the bulk and moisture should be performed after clearing and grubbing and just prior to embankment placement. However, if the embankment has already been placed, the sampling will need to be performed by digging test pits through the embankment material. If the depth to the natural subgrade is uncertain, but potentially within four feet, then test pits or auger borings should be performed to quantify this depth.

A summary of the samples, laboratory and field tests on the subgrade materials is presented in table 4. In this table, B-type samples are bulk samples of the natural subgrade materials. The T-type test locations are for nuclear moisture-density tests.

Bulk Samples

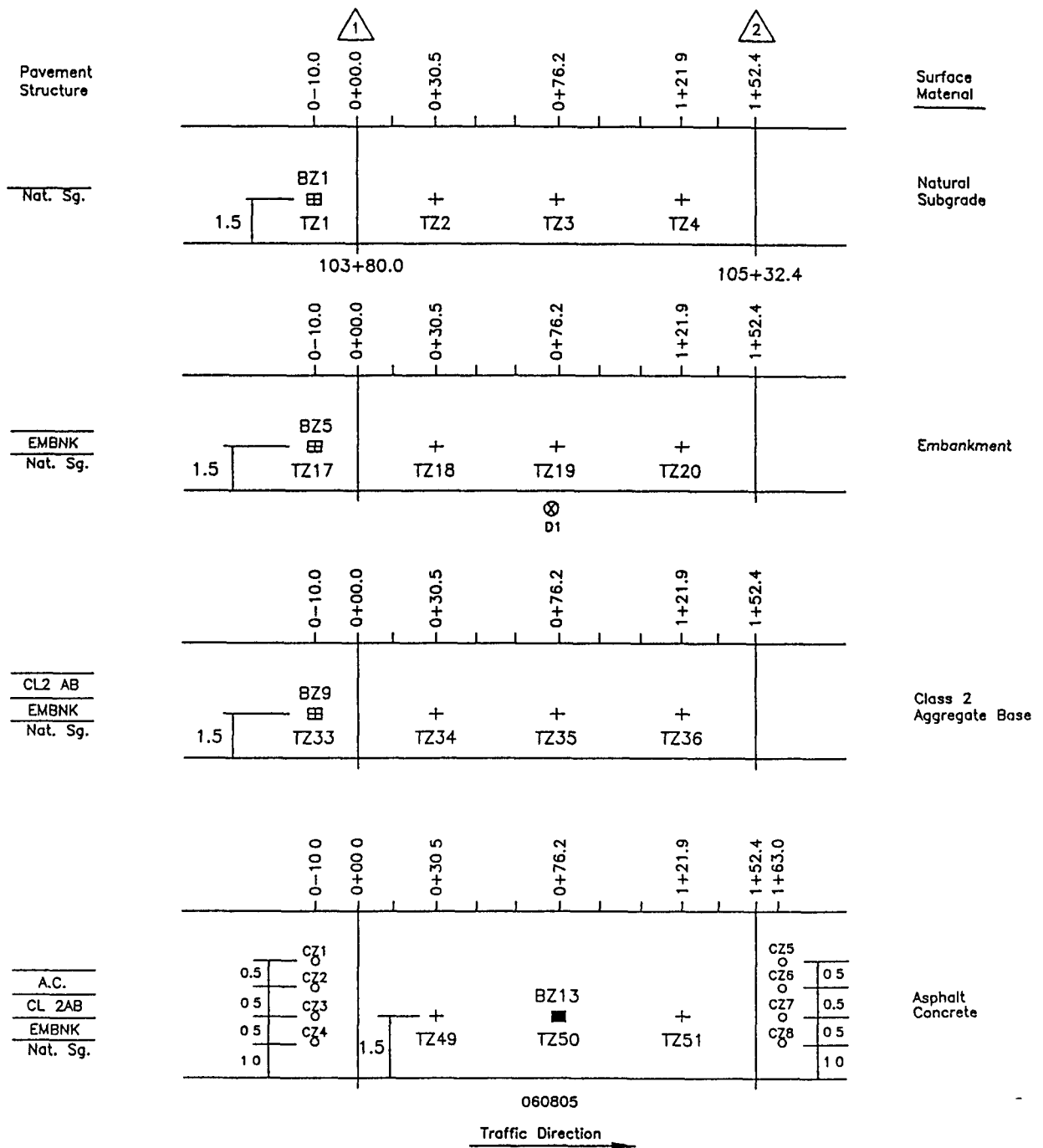
Bulk samples of the subgrade material should be obtained from the locations listed in table 5. In general, bulk sampling should consist of a single excavation, 0.6m by 0.6m in area and 0.3m deep. Approximately 182 kg of material should be obtained from each sampling location. The sampling operation should be performed following the procedures contained in Section 3.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling as appropriate. **In-place density and moisture tests should be obtained at each bulk sampling location prior to sampling operations.** Separate jar samples for gravimetric moisture tests should be collected at each bulk sample location. These sampling locations must be repaired by placing and compacting similar material.

Density and Moisture Measurements

In-place density and moisture measurements should be performed on the natural subgrade surface at the locations specified in table 6. These test shall be performed using a recently calibrated nuclear moisture-density gauges in accordance with the procedures in **AASHTO T238-86, Method B-Direct Transmission, AASHTO T239-86 and ASTM D2950-82.** Each measurement shall be the result of the average of four readings made during each 90° rotation of the nuclear gauge through a full 360°.

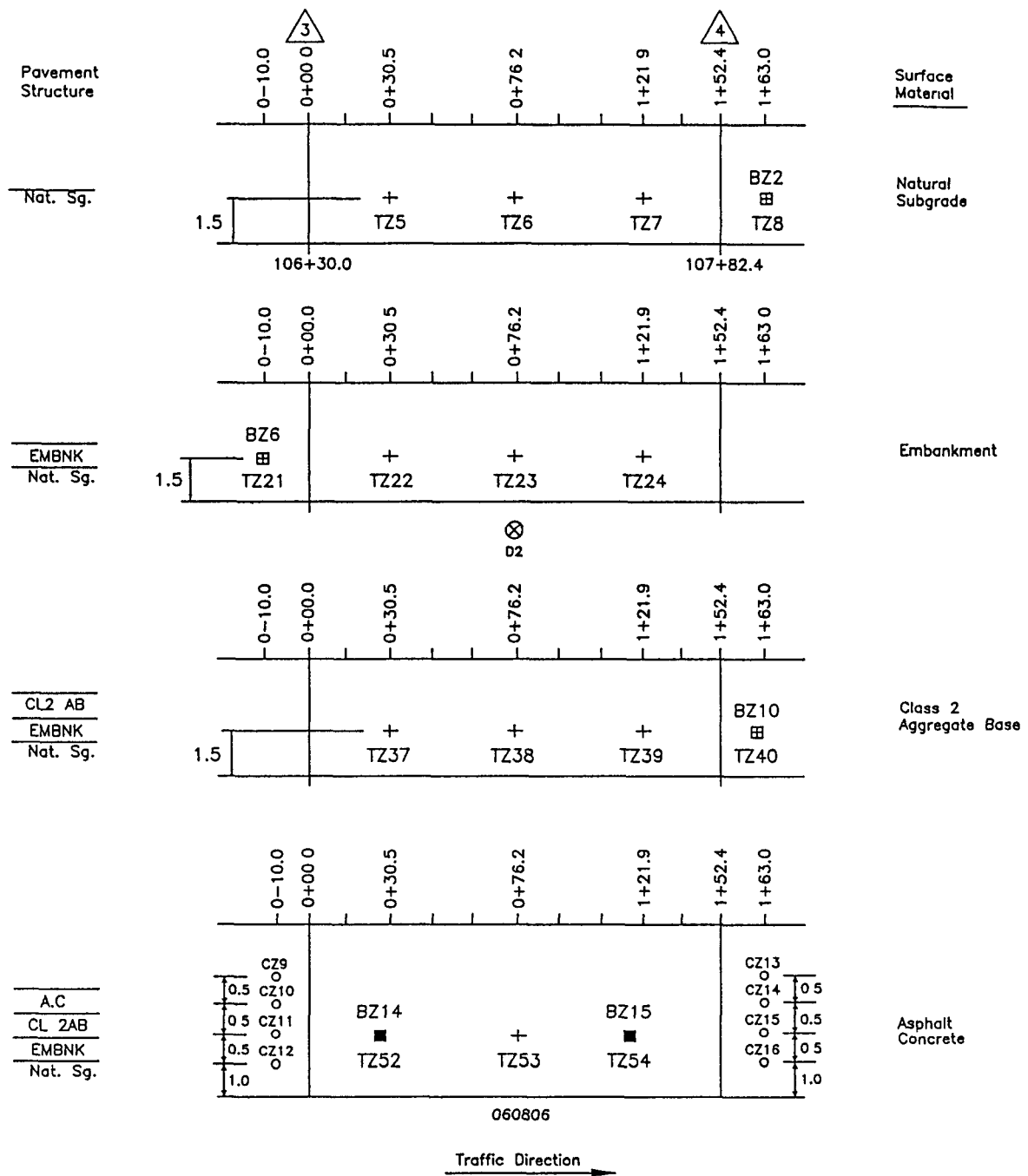
FWD Measurements

FWD measurements should be performed on each test section following the procedures and at the locations contained in LTPP SPS directive S4, "Deflection Testing of Subgrade and Base Layers for SPS-1, SPS-2, and SPS-8 Experiments." FWD testing will be performed by Nichols Consulting Engineers after coordination with the Caltrans Resident Engineer.



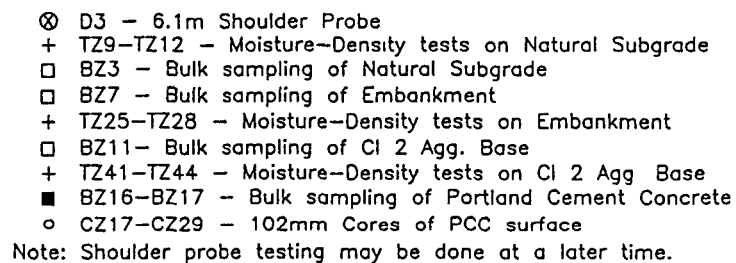
- ⊗ D1 - 6.1m Shoulder Probe
 - + TZ1-TZ4 - Moisture-Density tests on Natural Subgrade
 - BZ1 - Bulk sampling of Natural Subgrade
 - BZ5 - Bulk sampling of Prepared Subgrade/Embankment
 - + TZ17-TZ20 - Moisture-Density tests on Embankment/Prepared Subgrade
 - BZ9 - Bulk sampling of Class 2 Agg. Base
 - + TZ33-TZ36 - Moisture-Density tests on Class 2 Agg. Base
 - BZ13 - Bulk samples of Asphalt Concrete
 - BCZ13 is a bulk sample of Asphalt Cement from the plant
 - + TZ49-TZ51 - Density tests on Asphalt Concrete
 - CZ1-CZ8 - 102mm Cores of Asphalt Concrete
- Note: Shoulder probe testing may be performed at a later time.

Figure 2. Overview of sampling, testing and coring plan for asphalt concrete section 060805, SPS-8, California.



- ⊗ D2 - 6.1m Shoulder Probe
- + TZ5-TZ8 - Moisture-Density tests on Natural Subgrade
- BZ2 - Bulk sampling of Natural Subgrade
- BZ6 - Bulk sampling of Prepared Subgrade/Embankment
- + TZ21-TZ24 - Moisture-Density tests on Embankment/Prepared Subgrade
- BZ10 - Bulk sampling of Class 2 Agg. Base
- + TZ37-TZ40 - Moisture-Density tests on Class 2 Agg. Base
- BZ14-BZ15 - Bulk samples of Asphalt Concrete
- BCZ14 and BCZ15 are bulk Asphalt Cement samples from the plant
- + TZ52-TZ54 - Density tests on Asphalt Concrete
- CZ9-CZ16 - 102mm Cores of Asphalt Concrete

Figure 3. Overview of sampling, testing and coring plan for asphalt concrete section 060806, SPS-8, California.



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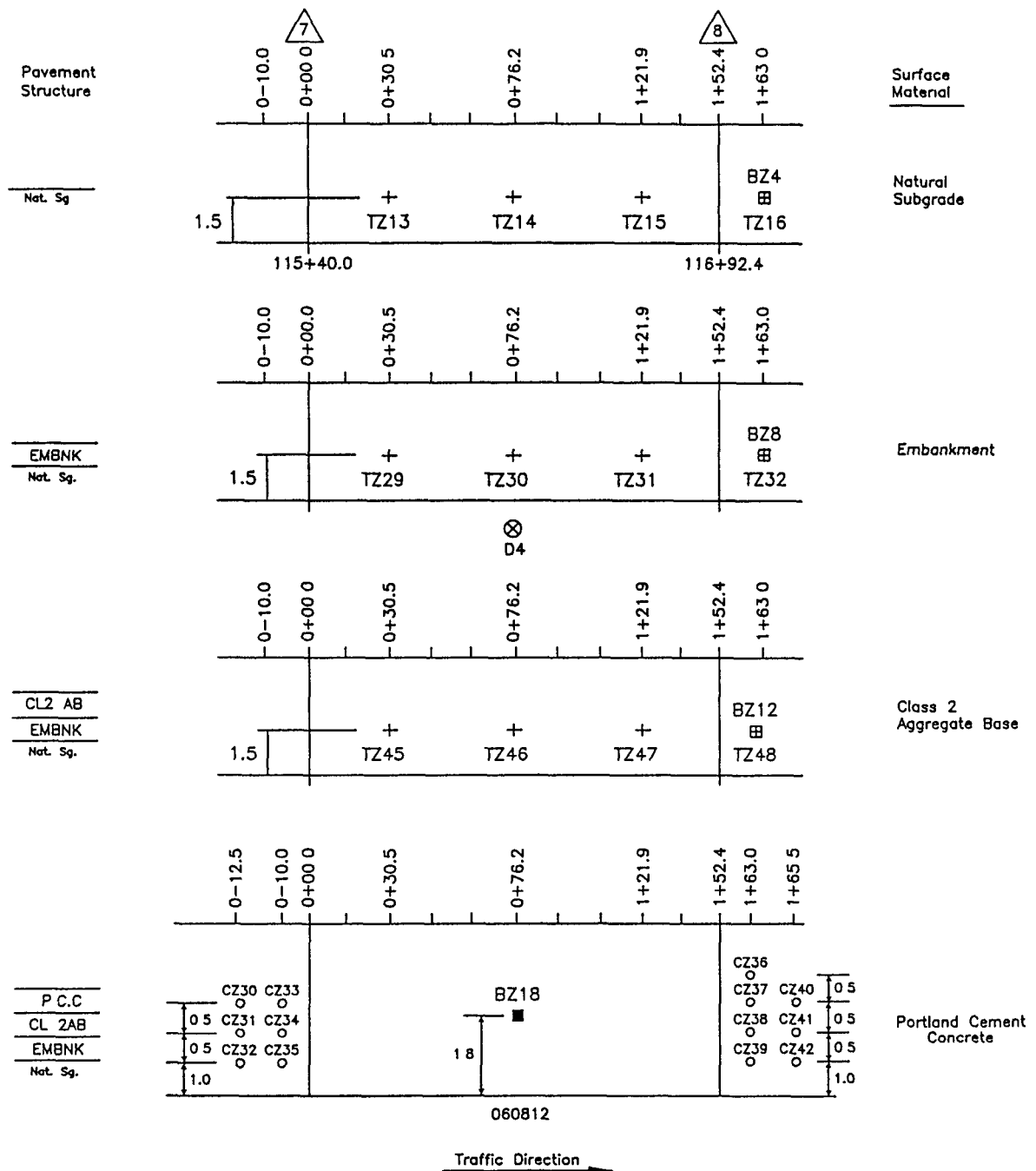


Figure 5. Overview of sampling, testing and coring plan for Portland Cement Concrete Section 060812, SPS-8, California.

Table 4. Field and laboratory test plan for **Natural Subgrade** materials, SPS-8, California.

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Sieve Analysis	SS01	Ship to FHWA Lab ¹	4	BZ1-BZ4
Hydrometer to 0.01mm	SS02	Ship to FHWA Lab ¹	4	BZ1-BZ4
Atterberg Limits	SS03	Ship to FHWA Lab ¹	4	BZ1-BZ4
Classification & Type of Subgrade	SS04	Ship to FHWA Lab ¹	4	BZ1-BZ4
Moisture-Density Relations	SS05	Ship to FHWA Lab ¹	4	BZ1-BZ4
Resilient Modulus	SS07	Ship to FHWA Lab ¹	4	BZ1-BZ4
Natural Moisture Content	SS09	Ship to FHWA Lab ¹	4	BZ1-BZ4
Permeability	SS11/UG09	P48	1	BZ2
In-Place Density		SHRP-LTPP Method	16	TZ1-TZ16

¹Ship to FHWA lab after splitting and quartering a 45 kg sample for the state testing.

Table 5. Locations for **Natural Subgrade** bulk sampling, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section	Sample Area
			Centerline, Rt	Outside Lane Edge, Lt		
BZ1	103+70.0	0-10.0	2.2	1.5	060805	1
BZ2	107+93.0	1+63.0	2.2	1.5	060806	4
BZ3	113+10.0	0-10.0	2.2	1.5	0608011	5
BZ4	117+03.0	1+63.0	2.2	1.5	0608012	8

Table 6. Locations for in-place density and moisture tests on Natural Subgrade, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section
			Centerline, Rt	Outside Lane Edge, Lt	
TZ1	103+70.0	0-10.0	2.2	1.5	060805
TZ2	104+10.5	0+30.5	2.2	1.5	060805
TZ3	104+56.2	0+76.2	2.2	1.5	060805
TZ4	105+01.9	1+21.9	2.2	1.5	060805
TZ5	106+60.5	0+30.5	2.2	1.5	060806
TZ6	107+06.2	0+76.2	2.2	1.5	060806
TZ7	107+51.9	1+21.9	2.2	1.5	060806
TZ8	107+93.7	1+63.0	2.2	1.5	060806
TZ9	113+10.0	0-10.0	2.2	1.5	060811
TZ10	113+50.5	0+30.5	2.2	1.5	060811
TZ11	113+96.2	0+76.2	2.2	1.5	060811
TZ12	114+41.9	1+21.9	2.2	1.5	060811
TZ13	115+70.5	0+30.5	2.2	1.5	060812
TZ14	116+16.2	0+76.2	2.2	1.5	060812
TZ15	116+61.9	1+21.9	2.2	1.5	060812
TZ16	117+03.0	1+63.0	2.2	1.5	060812

Prepared Embankment

The prepared embankment layer is either the material which has been processed on the roadway, i.e., remixed, moisture adjusted, relaid and recompact, such as in a cut section or material which has been added as a fill to raise the profile grade. This material will always be sampled and tested. The prepared embankment layer measurements, tests and sampling should be performed prior to placement of the base layers. The objective is to characterize the properties of the prepared embankment fill material immediately prior to the time when the base layers are placed. It is, therefore, desired that the moisture-density tests, bulk samples and elevation measurements be performed just prior to the time when the base course is placed. This is important in instances when the prepared embankment will be left exposed to the elements for a significant period, depending on climatic events which might influence the properties of the upper layers of the embankment.

A summary of the samples, laboratory and field tests on the prepared embankment materials is presented in table 7.

Bulk Samples

Bulk samples of the prepared embankment material should be obtained from the locations listed in table 8. In general, bulk sampling should consist of a single excavation, 0.6m by 0.6m in area and 0.3m deep. Approximately 182 kg of material should be obtained from each sampling location. The sampling operation should be performed following the procedures contained in Section 3.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling as appropriate. **In-place density and moisture tests should be obtained at each bulk sampling location prior to sampling operations.** Separate jar samples for gravimetric moisture tests should be collected at each bulk sample location. These sampling locations must be repaired by placing and compacting similar material.

Density and Moisture Measurements

Nuclear density and moisture measurements shall be performed on the prepared embankment material at the locations specified in table 9. These measurements shall be performed following the same procedures used for natural subgrade soils.

Splitspoon Sampling

Continuous splitspoon sampling shall be conducted to a depth of 6.1m using a truck mounted drill rig similar to that used for the shoulder auger boring (D type sampling locations). Locations are as shown in table 10. For a given 6.1m sample location, ten samples, each representing 0.6m of material shall be retrieved. A 152mm hollow-stem continuous flight auger with an inside diameter greater than 55mm shall be used to obtain the splitspoon samples. Samples shall be done using only a 63 kg hammer, 762mm drop and a sampler as specified in AASHTO T206, "Penetration Test and Split-barrel Sampling of Soils." Core retainers shall be used when necessary to retain soil. Care shall be exercised to provide a free

fall of the hammer (minimum friction and straight pipe) and to minimize variations in drop height. It is essential that a clearly visible reference mark be identified on the splitspoon drop hammer rod so that the drop height is consistent. Blow counts and strata depths and field classifications shall be recorded on Sampling Data Sheet 4-2.

FWD Measurements

FWD measurements should be performed on each test section following the procedure and at the locations contained in LTPP Directive S-4, "Deflection Testing of Subgrade and Base Layers for SPS-1, SPS-2, and SPS-8 Experiments." FWD testing will be performed by Nichols Consulting Engineers after coordination with the Caltrans Resident Engineer.

Table 7. Field and laboratory test plan for Prepared Embankment materials, SPS-8, California.

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Sieve Analysis	SS01	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Hydrometer to 0.01mm	SS02	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Atterberg Limits	SS03	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Classification & Type of Subgrade	SS04	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Moisture-Density Relations	SS05	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Resilient Modulus	SS07	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Natural Moisture Content	SS09	Ship to FHWA Lab ¹	4	BZ5,BZ6,BZ27,BZ8
Permeability	UG09	P48	1	BZ6
In-Place Density		LTPP Method	16	TZ17,TZ32
Depth to Rigid Layer		LTPP Method	4	DZ1 - DZ4
Expansion Index	SS12	P60	40	DZ1 - DZ4

¹Ship to FHWA lab after splitting and quartering a 45 kg sample for the state testing.

Table 8. Locations for Prepared bulk sampling, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section	Sample Area
			Centerline, Rt	Outside Lane Edge, Lt		
BZ5	103+70.0	0-10.0	2.2	1.5	060805	1
BZ6	106+20 0	0-10.0	2.2	1.5	060806	3
BZ7	113+10.0	0-10.0	2.2	1.5	060811	5
BZ8	117+03.0	1+63.0	2.2	1.5	060812	8

Table 9. Locations for in-place density and moisture tests on
Prepared Embankment, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section
			Centerline, Rt	Outside Lane Edge, Lt	
TZ17	103+70.0	0-10.0	2.2	1.5	060805
TZ18	104+10.5	0+30.5	2.2	1.5	060805
TZ19	104+56.2	0+76.2	2.2	1.5	060805
TZ20	105+01.9	1+21.9	2.2	1.5	060805
TZ21	106+20.0	0-10.0	2.2	1.5	060806
TZ22	106+60.5	0+30.5	2.2	1.5	060806
TZ23	107+06.2	0+76.2	2.2	1.5	060806
TZ24	107+51.9	1+21.9	2.2	1.5	060806
TZ25	113+10.0	0-10.0	2.2	1.5	060811
TZ26	113+50.5	0+30.5	2.2	1.5	060811
TZ27	113+96.2	0+76.2	2.2	1.5	060811
TZ28	114+41.9	1+21.9	2.2	1.5	060811
TZ29	115+70.5	0+30.5	2.2	1.5	060812
TZ30	116+16.2	0+76.2	2.2	1.5	060812
TZ31	116+61.9	1+21.9	2.2	1.5	060812
TZ32	117+03.0	1+63.0	2.2	1.5	060812

Table 10. Locations of 6.1m deep splitspoon sampling, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section
			Centerline, Rt	Outside Lane Edge, Rt	
DZ1	104+56.2	0+76.2	5.5	1.8	060805
DZ2	107+06.2	0+76.2	5.5	1.8	060806
DZ3	113+96.2	0+76.2	5.5	1.8	060811
DZ4	116+16.2	0+76.2	5.5	1.8	060812

Class 2 Aggregate Base

The measurements, tests and samples on the Class 2 Aggregate Base (CI2AB) layer should be performed prior to placement of the next layer. The objective is to characterize the properties of the prepared base at the time when the next pavement layer is placed. It is therefore desired that the moisture-density tests and elevation measurements be performed just prior to the time when the next pavement layer is placed. This is most important in instances when the aggregate base will be left exposed to the elements for a significant period, 2-3 months depending on climatic events, which might influence the properties of the material.

A summary of the samples to be taken from the CI2AB material and tests to be conducted are presented in table 11. Only bulk material and moisture jar samples of the CI2AB material are taken. Field tests include in-place density and moisture measurements.

Bulk Samples

Bulk samples of the CI2AB material should be obtained at the approximate locations specified in table 12. Sampling may be performed prior to compaction to avoid interruptions to construction activities. Uncontaminated 182 kg samples shall be obtained from each location. Procedures similar to those contained in section 3.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling should be followed. Jar moisture samples should be collected after final preparation of the CI2AB surface.

Density and Moisture Measurements

Nuclear density and moisture measurements shall be performed on top of the prepared CI2AB at the location specified in table 13. These measurements shall be performed following the same procedures used for subgrade soils.

FWD Measurements

FWD measurements should be performed on each test section following the procedure and at the locations contained in LTPP Directive S-4, "Deflection Testing of Subgrade and Base Layers for SPS-1, SPS-2, and SPS-8 Experiments." FWD testing will be performed by Nichols Consulting Engineers after coordination with the Caltrans Resident Engineer.

Table 11. Field and laboratory test plan for **Class 2 Aggregate Base** materials, SPS-8 California.

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Particle Size Analysis	UG01	Ship to FHWA lab ¹	4	BZ9-BZ12
Sieve Analysis (washed)	UG02	Ship to FHWA lab ¹	4	BZ9-BZ12
Atterberg Limits	UG04	Ship to FHWA lab ¹	4	BZ9-BZ12
Moisture-Density Relations	UG05	Ship to FHWA lab ¹	4	BZ9-BZ12
Resilient Modulus	UG07	Ship to FHWA lab ¹	4	BZ9-BZ12
Classification	UG08	Ship to FHWA lab ¹	4	BZ9-BZ12
Permeability	UG09	P48	1	BZ11
Natural Moisture Content	UG10	Ship to FHWA lab ¹	4	BZ9-BZ12
In-Place Density		SHRP-LTPP Method	16	TZ33 - TZ48

¹Ship to FHWA lab after splitting and quartering a 45 kg sample for the state testing.

Table 12. Bulk sampling of uncompacted **Class 2 Aggregate Base**, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section	Sample Area
			Centerline, Rt	Outside Lane Edge, Lt		
BZ9	103+70.0	0-10.0	2.2	1.5	060805	1
BZ10	107+93.0	1+63.0	2.2	1.5	060806	4
BZ11	113+10.0	0-10.0	2.2	1.5	060811	5
BZ12	117+03.0	1+63.0	2.2	1.5	060812	8

Table 13. Locations for in-place moisture and density measurements on compacted **Class 2 Aggregate Base**, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section
			Centerline, Rt	Outside Lane Edge, Lt	
TZ33	103+70.0	0-10.0	2.2	1.5	060805
TZ34	104+10.5	0+30.5	2.2	1.5	060805
TZ35	104+56.2	0+76.2	2.2	1.5	060805
TZ36	105+01.9	1+21.9	2.2	1.5	060805
TZ37	106+60.5	0+30.5	2.2	1.5	060806
TZ38	107+06.2	0+76.2	2.2	1.5	060806
TZ39	107+51.9	1+21.9	2.2	1.5	060806
TZ40	107+93.7	1+63.0	2.2	1.5	060806
TZ41	113+10.0	0-10.0	2.2	1.5	060811
TZ42	113+50.5	0+30.5	2.2	1.5	060811
TZ43	113+96.2	0+76.2	2.2	1.5	060811
TZ44	114+41.9	1+21.9	2.2	1.5	060811
TZ45	115+70.5	0+30.5	2.2	1.5	060812
TZ46	116+16.2	0+76.2	2.2	1.5	060812
TZ47	116+61.9	1+21.9	2.2	1.5	060812
TZ48	117+03.0	1+63.0	2.2	1.5	060812

Asphalt Concrete Surface

The field and laboratory test plan for the Asphalt Concrete (AC) materials is presented in table 14. Sampling of this material includes bulk samples of the asphalt, aggregate, and uncompacted mix and cores obtained after placement and compaction of the AC surface material. Nuclear density tests should also be performed on the compacted surface.

Bulk Samples

Bulk sampling of the uncompacted mix can be performed at the test site from a haul vehicle or near the paver. Care should be taken to obtain the designated samples of the materials to be placed in the test sections shown in figures 2 and 3. These samples shall be obtained in accordance with **AASHTO T168** and shipped to the laboratory in suitable containers. If sampling at the test site is not feasible, then bulk sampling can be performed at the mix plant provided that the material sampled is the same material being placed in the designated test section. Three 90 kg samples of the mixture shall be collected.

Samples of the asphalt cement should consist of three 19 l pails obtained from the mix plant. Collect samples from the mix plant after asphalt has been heated for mixing. Three pails of each type of asphalt cement used on the project are needed.

Cores

Cores of the asphalt concrete shall have a 102mm diameter. The core locations are listed in table 15. The resilient modulus test, indirect tensile strength test, and creep compliance test will be performed by the FHWA-LTPP Testing Contractor Laboratory.

Care shall be taken to insure that all cores are obtained at a 90° angle to the pavement surface and that the edges are straight, intact, smooth and suitable for laboratory testing. All cores shall be marked on the surface with an arrow indicating the direction of traffic. Details on tolerance and quality control of coring operations are contained in Section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

Care shall be taken to package all cores for transport and shipping in suitable containers to prevent damage or degradation of the core during transport.

Density Measurements

Nuclear density measurements shall be performed on top of the prepared AC at the location specified in table 16. These measurements shall be performed following **AASHTO T238-86, Backscatter Method**. As with the unbound materials, each testing location shall have four readings with the density instrument rotated 90° between each reading.

FWD Testing

FWD testing of the AC surface should be performed in accordance with appendix B-8 and table B-8.2 of the Manual for FWD Testing in the LTPP. FWD testing will be performed by Nichols Consulting Engineers after coordination with the Caltrans Resident Engineer.

**Table 14. Field and laboratory test plan for Asphalt Concrete
surface materials, SPS-8 California.**

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Core Examination/Thickness	AC01	P01	3	CZ10-CZ12
Bulk Specific Gravity	AC02	P02	3	CZ10-CZ12
Maximum Specific Gravity	AC03	P03	3	BZ13-BZ15 from Paver
Asphalt Content (Extraction)	AC04	P04	3	BZ13-BZ15 from Paver
Moisture Susceptibility	AC05	P05	3	BZ13-BZ15 from Paver
Creep Compliance	AC06	Ship to FHWA lab	1	CZ9
Resilient Modulus	AC07	Ship to FHWA lab	9	CZ1-CZ3,CZ5-CZ7,CZ13-CZ15
Indirect Tensile Strength	AC07	Ship to FHWA lab	3	CZ4,CZ8,CZ16
In-Place Density		SHRP-LTPP Method	6	TZ49-TZ54
Asphalt Cement				
Abson Recovery	AE01	P21	3	BZ13-BZ15 from Paver
Penetration @ 25°C,46.1°C	AE02	P22	3	BZ13-BZ15 from Paver
Specific Gravity @ 15.6°C	AE03	P23	3	BZ13-BZ15 from Paver
Viscosity @ 25°C	AE04	P24	3	BZ13-BZ15 from Paver
Viscosity @ 60°C,135°C	AE05	P25	3	BZ13-BZ15 from Paver
Extracted Aggregate				
Specific Gravity of Coarse Aggregate	AG01	P11	3	BZ13-BZ15 from Paver
Specific Gravity of Fine Aggregate	AG02	P12	3	BZ13-BZ15 from Paver
Aggregate Gradation	AG04	P14	3	BZ13-BZ15 from Paver
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3	BZ13-BZ15 from Paver
Asphalt Cement (from Plant)				
Penetration @ 25°C, 46.1°C	AE02	P22	3	BCZ13-BCZ15 from Plant
Specific Gravity @ 15.6°C	AE03	P23	3	BCZ13-BCZ15 from Plant
Viscosity @ 25°C	AE04	P24	3	BCZ13-BCZ15 from Plant
Viscosity @ 60°C,135°C	AE05	P25	3	BCZ13-BCZ15 from Plant
Asphalt Cement samples (three 19-l pails)	Storage	Ship to MRL ¹	50-l	Mix Plant
Aggregate samples (one 200-l drum)	Storage	Ship to MRL ¹	220 kg	Mix Plant
Bulk asphalt concrete mixture samples (three 19-l pails)	Storage	Ship to MRL ¹	90 kg	Roadway

¹Containers and shipping will be provided by FHWA.

Table 15. Asphalt Concrete core locations, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section	Sample Area
			Centerline, Rt	Outside Lane Edge, Lt		
CZ1	103+70.0	0-10 0	1.2	2.5	060805	1
CZ2	103+70.0	0-10.0	1.7	2.0	060805	1
CZ3	103+70.0	0-10.0	2.2	1.5	060805	1
CZ4	103+70.0	0-10.0	2.7	1.0	060805	1
CZ5	105+43.0	1+63.0	1.2	2.5	060805	2
CZ6	105+43.0	1+63.0	1.7	2.0	060805	2
CZ7	105+43 0	1+63.0	2.2	1.5	060805	2
CZ8	105+43.0	1+63.0	2.7	1.0	060805	2
CZ9	106+20 0	0-10.0	1.2	2.5	060806	3
CZ10	106+20.0	0-10.0	1.7	2.0	060806	3
CZ11	106+20 0	0-10.0	2.2	1.5	060806	3
CZ12	106+20.0	0-10.0	2.7	1.0	060806	3
CZ13	107+93.0	1+63.0	1.2	2.5	060806	4
CZ14	107+93.0	1+63.0	1.7	2.0	060806	4
CZ15	107+93.0	1+63.0	2.2	1.5	060806	4
CZ16	107+93.0	1+63.0	2.7	1.0	060806	4

Table 16. Locations for in-place density measurements on compacted Asphalt Concrete, SPS-8 California.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, m		Test Section
			Centerline, Rt	Outside Lane Edge, Lt	
TZ49	104+10.5	0+30.5	2.2	1.5	060805
TZ50	104+56.2	0+76.2	2.2	1.5	060805
TZ51	105+01.9	1+21.9	2.2	1.5	060805
TZ52	106+60.5	0+30.5	2.2	1.5	060806
TZ53	107+06.2	0+76.2	2.2	1.5	060806
TZ54	107+51.9	1+21.0	2.2	1.5	060806

Portland Cement Concrete

Sampling of the Portland Cement Concrete (PCC) materials shall include beams and cylinders molded from bulk samples of the as-delivered material, and cores obtained from the material as placed.

As-Delivered

Sampling of the PCC mix shall be performed in the field, during placement. A summary of the sampling and testing plan for the as-delivered PCC materials are shown in table 17. The test sections from which the designated bulk samples should be obtained are shown in figures 4 and 5. These samples shall be obtained in accordance with **AASHTO T141 "Sampling Fresh Concrete"**, molded into the specimens specified in table 18, cured, packaged and shipped to the laboratory. All specimens shall be made and cured in the field in accordance with **AASHTO T23 "Making and Curing Concrete Specimens in the Field"** and **AASHTO T126 "Making and Curing Concrete Specimens in the Laboratory."** As shown in table 18, six - 152mm by 305mm cylindrical specimens and three - 152mm by 152mm by 508mm long beam specimens shall be molded from each bulk sample. Molded concrete samples shall be transported in accordance with **Section 10, "Transportation of Specimens to Laboratory"** of **ASTM C31**. Field tests shall be performed on the bulk samples of fresh concrete to determine mix temperature, slump, and air content (volumetric). Samples shall be obtained in accordance with **ASTM C172** and tests performed in accordance with **ASTM C1064 (temperature)**, **ASTM C231 (air content)**, and **ASTM C143 (slump)**.

As-Placed

A summary of the sampling and testing plan for the as-placed (PCC) materials is shown in table 19. Sampling of the as-placed PCC materials shall consist of 102mm diameter cores. The cores shall be obtained at least 2 to 4 days prior to the specified age for conducting the laboratory tests. This is to allow for a 40 hour lime water bath soak period immediately prior to testing the strength specimen. In table 19, tests on the cores are specified at 14 days, 28 days, and 1 year after placement. The objective of these tests are to characterize the properties of the concrete after being subjected to in-place curing conditions. These cores shall be obtained during the following time periods:

Specified Test Age	Date After Placement to Obtain Cores
14 days	10 - 12 days
28 days	21 - 24 days
1 year	350 - 360 days

The locations of the PCC cores are specified in table 20. Coring operations shall be performed in accordance with **AASHTO T24 "Obtaining and Testing Drilled Cores and Sawed Beams of Concrete"** using equipment specified in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling. Plugs shall not be inserted in cores intended for laboratory testing. All cores shall be dried prior to packaging.

Care shall be taken to insure that cores are obtained at a 90° angle to the pavement surface and that the edges are straight, intact, smooth and suitable for laboratory testing. Details on tolerances and quality control of coring operations are contained in section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

FWD Testing

FWD testing of PCC surface shall be performed in accordance with appendix B-8 and table B-8.1 of the Manual for FWD Testing in the LTPP. FWD testing will be performed by Nichols Consulting Engineers after coordination with the Caltrans Resident Engineer.

Table 17. Field and laboratory test plan for as delivered PCC materials, SPS-8 California.

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Portland Cement Concrete - As Delivered				
Compressive Strength	PC01	P61		
14 Day			3	BZ16-BZ18 ¹
28 Day			3	
1 Year			3	
Splitting Tensile Strength	PC02	P62		
14 Day			3	BZ16-BZ18
28 Day			3	
1 Year			3	
Flexural Strength	PC09	P69		
14 Day			3	BZ16-BZ18
28 Day			3	
1 Year			3	
Air Content	ASTM C231	LTPP Method	3	BZ16-BZ18
Slump	ASTM C143	LTPP Method	3	BZ16-BZ18
Temperature	ASTM C1064	LTPP Method	3	BZ16-BZ18

¹A total of 6 cylinder specimens and 3 beam specimens are molded from each PCC bulk sample.

Table 18. Bulk samples and molded specimens from PCC mix on SPS-8 California.

Sample Number	Test Age After Molding	Specimen Number			Test Section
		152x305mm Cylinder Compression Test	152x305mm Cylinder Indirect Tensile	152x152x508mm Beam Flexural Strength	
BZ16	14 days	GXZ01	GXZ04	FXZ01	060811
	28 days	GYZ02	GYZ05	FYZ02	
	1 year	GZZ03	GZZ06	FZZ03	
BZ17	14 days	GXZ07	GXZ10	FXZ04	060811
	28 days	GYZ08	GYZ11	FYZ05	
	1 year	GZZ09	GZZ12	FZZ06	
BZ18	14 days	GXZ13	GXZ16	FXZ07	060812
	28 days	GYZ14	GYZ17	FYZ08	
	1 year	GZZ15	GZZ18	FZZ09	

Table 19. Field and laboratory test plan for as-placed PCC materials, SPS-8 California.

Test Name	SHRP Test Designation	SHRP Protocol	No. of Tests	Material Source/ Test Location
Portland Cement Concrete - As Placed				
Compressive Strength	PC01	P61		
14 Day			3	CZ17,CZ26,CZ36
28 Day			3	CZ18,CZ27,CZ35
1 Year			3	CZ20,CZ29,CZ38
Splitting Tensile Strength	PC02	P62		
14 Day			3	CZ21,CZ30,CZ39
28 Day			3	CZ22,CZ31,CZ40
1 Year			3	CZ24,CZ33,CZ42
PCC Unit Weight	PC05	P65	9	All compressive strength cores
Static Modulus of Elasticity	PC04	PC64		
28 Day			3	CZ19,CZ28,CZ37
1 Year			3	CZ23,CZ32,CZ41
Air Content @ 28 Days	PC08	PC68	1	CZ25
PCC Thermal Coefficient		Ship to FHWA	1	CZ34
Core Examination	PC06	P66	26	All cores

Table 20. PCC core locations on SPS-8 California.

Sample Location Designation	Stationing	Test Section Station	Offset, m		Test Section	Sample Area	Coring Days After Placement
			Centerline	Outside Lane Edge, Lt			
CZ17	113+07.5	0-12.5	1.7	2.0	060811	5	10-13
CZ18	113+07.5	0-12.5	2.2	1.5	060811	5	21-24
CZ19	113+07.5	0-12.5	2.7	1.0	060811	5	21-24
CZ20	103+10.0	0-10.0	1.2	2.5	060811	5	350-360
CZ21	103+10.0	0-10.0	1.7	2.0	060811	5	10-13
CZ22	103+10.0	0-10.0	2.2	1.5	060811	5	21-24
CZ23	103+10.0	0-10.0	2.7	1.0	060811	5	350-360
CZ24	114+83.0	1+63.0	1.7	2.0	060811	6	350-360
CZ25	114+83.0	1+63.0	2.2	1.5	060811	6	21-24
CZ26	114+83.0	1+63.0	2.7	1.0	060811	6	10-13
CZ27	114+85.5	1+65.5	1.7	2.0	060811	6	21-24
CZ28	114+85.5	1+65.5	2.2	1.5	060811	6	21-24
CZ29	114+85.5	1+65.5	2.7	1.0	060811	6	350-360
CZ30	115+27.5	0-12.5	1.7	2.0	060812	7	10-13
CZ31	115+27.5	0-12.5	2.2	1.5	060812	7	21-24
CZ32	115+27.5	0-12.5	2.7	1.0	060812	7	350-360
CZ33	115+30.0	0-10 0	1.7	2.0	060812	7	350-360
CZ34	115+30.0	0-10 0	2.2	1.5	060812	7	21-24
CZ35	115+30.0	0-10.0	2.7	1.0	060812	7	21-24
CZ36	117+03.0	1+63.0	1.2	2.5	060812	8	10-13
CZ37	117+03.0	1+63.0	1.7	2.0	060812	8	21-24
CZ38	117+03.0	1+63.0	2.2	1.5	060812	8	350-360
CZ39	117+03.0	1+63.0	2.7	1.0	060812	8	10-13
CZ40	117+05.5	1+65.5	1.7	2.0	060812	8	21-24
CZ41	117+05.5	1+65.5	2.2	1.5	060812	8	350-360
CZ42	117+05.5	1+65.5	2.7	1.0	060812	8	350-360

Materials Reference Library (MRL)

During pavement construction, additional sampling of the AC and PCC layers is required. The samples obtained will be used as a record of the materials being used on the project and they will be sent to a special facility for long-term storage. The material to be obtained for this purpose shall consist of the following:

Asphalt Concrete Samples

- 3 19 liter pails of asphalt cement used in the asphalt concrete mix (approximately 50 l). Collect from the mix plant after asphalt has been heated for mixing.
- 1 200 liter drum (approximately 220 kg) of the finished aggregate product (combined coarse and fine aggregate) used in the asphalt concrete mix. This material shall be sampled in accordance with applicable portions of AASHTO Designation T2. For drum plants, the aggregate should be obtained from the charging (inclined) conveyor using the bypass chute, if possible. Otherwise the material should be taken from the belt on the charging conveyor. The aggregates should be sampled from the inclined conveyor at the dryer on batch plants.
- 3 19 liter pails of the finished asphalt concrete mix material used on the test sections (approximately 90 kg). This material shall be sampled at the plant or from the site in accordance with applicable sections of AASHTO T168.

Portland Cement Concrete Samples

- 1 19 liter pail of portland cement, approximately 23 kg (sealed in a heavy plastic bag and placed into the pail)
- 1 19 liter pail of flyash, approximately 23 kg (sealed in a heavy plastic bag and placed into the pail)
- 1 1 liter of each liquid additive (stored in glass containers suitably protected from breakage)
- 4 19 liter pails of fine aggregate (from the Plant)
- 4 19 liter pails of coarse aggregate (from the Plant)

Containers (pails/drums) for the storage of these samples will be provided by the LTPP Materials Reference Library (MRL) at no cost to the state. These containers are of special manufacture to accommodate long-term storage. It will be necessary that scheduling information be furnished to the LTPP Materials Reference Library contractor as soon as this information is available. This information should, at the minimum, contain: (1) date containers needed, (2) highway agency contact name, (3) shipping address, and (4) telephone number.

The contact names and telephone numbers for the LTPP Materials Reference Library are as follows:

Contact Name	Affiliation	Phone No.
Mr. Kevin Kawalkowski	Nichols Consulting Engineers, Chtd.	775/358-7574
Dr. Sirous Alavi	Nichols Consulting Engineers, Chtd.	775/329-4955
Mr. Kevin Senn	Nichols Consulting Engineers, Chtd.	775/329-4955

The SPS-8 samples to be shipped to the MRL will be by a common carrier and the cost will be borne by the MRL contractor (Nichols Consulting Engineers Chtd.). The participating agency should contact the MRL office for exact coordination and sample shipping details. Any of the names listed above may be contacted but it is preferable that Mr. Kevin Kawalkowski be the primary contact point for the participating agencies.

A copy of Field Operations Information Form 1 should be completed and included with the shipment and another copy of the form should be mailed separately. This will allow a trace of the shipment if it does not arrive in a timely manner.

Elevation Measurements

Elevation measurements shall be made on the surface of each pavement layer (natural sub-grade, prepared embankment, dense graded aggregate base and AC or PCC surface) at the locations specified in figure 6. Measurements must be made to an accuracy of 0.005m. Care must be taken to re-establish the same points on the surface of each succeeding material layer to insure accurate determination of the thickness of each layer.

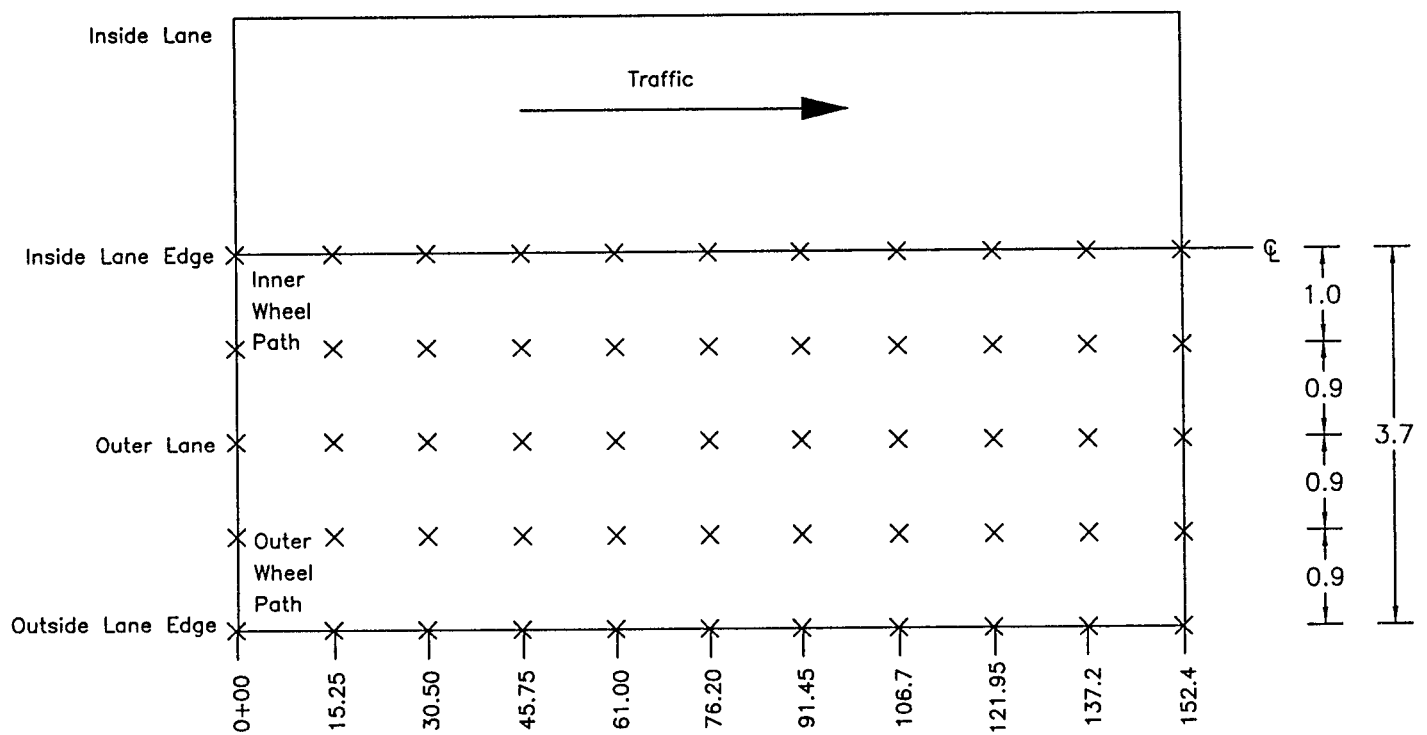


Figure 6. Test section elevation measurement location for SPS-8 California

Shipping Tracking Tables

This section contains a shipping tracking tables which contains instructions for disposition of samples retrieved from the field. Using these tracking tables (tables 21 and 22), sampling personnel can determine where each sample should be shipped and tested.

Each sample (core, bulk, moisture, etc.) shall be assigned a four digit number that must be recorded on the data forms. The sample code number will consist of two letters on the left side and up to three numbers on the right side.

The first letter on the left identifies the sample type in one of the following categories:

- C - core sample
- B - bulk sample
- M - moisture sample
- F - formed beams of Portland Cement Concrete surface
- G - formed cylinders of Portland Cement Concrete surface

The second letter from the left identifies the material type or designated curing time prior to testing of the sample. This designation can be identified as one of the following categories:

- P - portland cement concrete
- G - untreated, unbound granular material (base/subbase)
- S - subgrade soil or fill material
- X - molded specimens of PCC for tests at 14 days
- Y - molded specimens of PCC for tests at 28 days after placement
- Z - molded specimens of PCC for tests at 365 days after placement

The numbers on the right will designate the sample number. The numbers shall be assigned consecutively for each sample type. For example, samples taken at C-Type locations be designated CP01, CP02, CP03, etc. for the PCC material. Samples of subgrade material taken from location B1 by bulk sampling shall be designated BS01. If a bulk sample of one layer is contained in more than one bag, then the number of bags and the same bulk sample number should be recorded on each bag.

The following is a list of valid combinations of letters and numbers making up sample code numbers:

- FX01 Formed portland cement concrete beams for testing at 14 days. Assign numbers consecutively as samples are molded.
- FY01 Formed portland cement concrete beams for testing at 28 days. Assign numbers consecutively as samples are molded.
- FZ01 Formed portland cement concrete beams for testing at 365 days. Assign numbers consecutively as samples are molded.

<u>GX01</u>	Formed portland cement concrete cylinders for testing at 14 days. Assign numbers consecutively as samples are obtained.
<u>GY01</u>	Formed portland cement concrete cylinders for testing at 28 days. Assign numbers consecutively as samples are obtained.
<u>GZ01</u>	Formed portland cement concrete cylinders for testing at 365 days. Assign numbers consecutively as samples are obtained.
<u>CP01</u>	Portland cement concrete cores obtained from the finished concrete surface. Assign numbers consecutively as the cores are obtained.
<u>BG01</u>	Bulk samples of granular base or subbase. Assign BG01-BG10 to represent embankment material and BG11-BG20 to represent aggregate base material.
<u>BS01</u>	Bulk samples of subgrade material from different sampling areas within the test site. Assign sample numbers consecutively (BS01, BS02, etc.) as samples are obtained.
<u>MG01</u>	Granular base samples obtained solely for determining natural moisture content.
<u>MS01</u>	Subgrade samples obtained from bulk sampling locations for moisture content determination.
<u>JS01</u>	Jar samples of subgrade from splitspoon sampler.

The State Laboratory (or their designee) refers to the agency responsible for the project. The FHWA-LTPP Testing Contractor Laboratory refers to Braun Intertec, Inc.

The Laboratory Test Number shall be assigned as per the following:

- a. Beginning of the Section (Station 0-): samples of each layer that are retrieved from areas in the approach end of the test section (stations preceding 0+00) shall be assigned Laboratory Test Number '1'.
- b. End of the Section (Stations 1+): samples of each layer that are retrieved from areas in the leave end of the test section (stations after 1+52.4) shall be assigned Laboratory Test Number '2'.
- c. Middle of the Section (Stations 0+00 to 1+52.4): samples of each layer that are retrieved from areas in the middle of the test section (e.g., from the paver) shall be assigned Laboratory Test Number '3'.

Table 21. Samples to be retained by the State Laboratory
(or their designee), SPS-8 California.

Sample Location No.	Sample No.	Lab Test No.	Type of Sample
Asphalt Concrete			
CZ10	CAZ10	1	102-mm core
CZ11	CAZ11	1	102-mm core
CZ12	CAZ12	1	102-mm core
BZ13	BAZ13	3	91-kg bulk sample asphalt mixture
BZ14	BAZ14	3	91-kg bulk sample asphalt mixture
BZ15	BAZ15	3	91-kg bulk sample asphalt mixture
BCZ13	BCZ13	3	19-1 bulk sample asphalt cement
BCZ14	BCZ14	3	19-1 bulk sample asphalt cement
BCZ15	BCZ15	3	19-1 bulk sample asphalt cement
Class 2 Aggregate Base			
BZ9	BGZ09	1	182-kg bulk sample ¹
BZ10	BGZ10	2	182-kg bulk sample ¹
BZ11	BGZ11	1	182-kg bulk sample ¹
BZ12	BGZ12	2	182-kg bulk sample ¹
Prepared Embankment			
BZ5	BGZ05	1	182-kg bulk sample ¹
BZ6	BGZ06	1	182-kg bulk sample ¹
BZ7	BGZ07	1	182-kg bulk sample ¹
BZ8	BGZ08	2	182-kg bulk sample ¹
Natural Subgrade			
BZ1	BSZ01	1	182-kg bulk sample ¹
BZ2	BSZ02	2	182-kg bulk sample ¹
BZ3	BSZ03	1	182-kg bulk sample ¹
BZ4	BSZ04	2	182-kg bulk sample ¹
Portland Cement Concrete			
BZ16	GXZ01	3	152x305-mm cylinder
BZ16	GXZ02	3	152x305-mm cylinder
BZ16	GYZ01	3	152x305-mm cylinder
BZ16	GYZ02	3	152x305-mm cylinder
BZ16	GZZ01	3	152x305-mm cylinder
BZ16	GZZ02	3	152x305-mm cylinder
BZ16	FXZ01	3	152x152x508-mm beam
BZ16	FXZ02	3	152x152x508-mm beam
BZ16	FXZ03	3	152x152x508-mm beam
BZ17	GXZ03	3	152x152x305-mm cylinder
BZ17	GXZ04	3	152x152x305-mm cylinder
BZ17	GYZ03	3	152x152x305-mm cylinder
BZ17	GYZ04	3	152x152x305-mm cylinder
BZ17	GZZ03	3	152x152x305-mm cylinder

Table 21. Samples to be retained by the State Laboratory
(or their designee), SPS-8 California. (cont'd)

Sample Location No.	Sample No.	Lab Test No.	Type of Sample
BZ17	GZZ04	3	152x152x305-mm cylinder
BZ17	FXZ04	3	152x152x508-mm beam
BZ17	FXZ05	3	152x152x508-mm beam
BZ17	FXZ06	3	152x152x508-mm beam
BZ18	GXZ05	3	152x152x305-mm cylinder
BZ18	GXZ06	3	152x152x305-mm cylinder
BZ18	GYZ05	3	152x152x305-mm cylinder
BZ18	GYZ06	3	152x152x305-mm cylinder
BZ18	GZZ05	3	152x152x305-mm cylinder
BZ18	GZZ06	3	152x152x305-mm cylinder
BZ18	FXZ07	3	152x152x508-mm beam
BZ18	FXZ08	3	152x152x508-mm beam
BZ18	FXZ09	3	152x152x508-mm beam

Table 22. Samples to be shipped to the FHWA-LTPP Testing Contractor Laboratory, SPS-8 California.

Sample Location Number	Sample Number	Lab Test Number	Type of Sample
Asphalt Concrete			
CZ1	CAZ01	1	102-mm core
CZ2	CAZ02	1	102-mm core
CZ3	CAZ03	1	102-mm core
CZ4	CAZ04	1	102-mm core
CZ5	CAZ05	2	102-mm core
CZ6	CAZ06	2	102-mm core
CZ7	CAZ07	2	102-mm core
CZ8	CAZ08	2	102-mm core
CZ9	CAZ09	1	102-mm core
CZ13	CAZ13	2	102-mm core
CZ14	CAZ14	2	102-mm core
CZ15	CAZ15	2	102-mm core
CZ16	CAZ16	2	102-mm core
Class 2 Aggregate Base			
BZ9	BGZ09	1	136-kg bulk sample ¹
BZ10	BGZ10	2	136-kg bulk sample ¹
BZ11	BGZ11	1	136-kg bulk sample ¹
BZ12	BGZ12	2	136-kg bulk sample ¹
BZ9	MGZ09	1	Moisture content jar sample
BZ10	MGZ10	2	Moisture content jar sample
BZ11	MGZ11	1	Moisture content jar sample
BZ12	MGZ12	2	Moisture content jar sample
Prepared Embankment			
BZ5	BGZ05	1	136-kg bulk sample ¹
BZ6	BGZ06	1	136-kg bulk sample ¹
BZ7	BGZ07	1	136-kg bulk sample ¹
BZ8	BGZ08	2	136-kg bulk sample ¹
BZ5	MGZ05	1	Moisture content jar sample
BZ6	MGZ06	1	Moisture content jar sample
BZ7	MGZ07	1	Moisture content jar sample
BZ8	MGZ08	2	Moisture content jar sample
Natural Subgrade			
BZ1	BSZ01	1	136-kg bulk sample ¹
BZ2	BSZ02	2	136-kg bulk sample ¹
BZ3	BSZ03	1	136-kg bulk sample ¹
BZ4	BSZ04	2	136-kg bulk sample ¹
BZ1	MSZ01	1	Moisture content jar sample
BZ2	MSZ02	2	Moisture content jar sample
BZ3	MSZ03	1	Moisture content jar sample
BZ4	MSZ04	2	Moisture content jar sample

¹The bulk sample shall be obtained from the participating agency.

Laboratory Tracking of Samples

This section contains Laboratory Sample Tracking Tables which contain instructions for sample handling and tracking throughout the laboratory testing process. Tables 23 through 27 detail the sample handling and testing for the state agency laboratory and tables 28 through 32 detail the sample handling and testing for the FHWA-LTPP Laboratory Materials Testing Contractor.

These tables provide the laboratories with the following information and directions:

- tracking of samples as they are taken from the field and tested in the laboratory,
- laboratory test sequences for each pavement material type,
- dedicated sample(s) for each test,
- designation of extra samples for future use,
- instructions for sample storage, and
- special instructions and other remarks.

The following is a description of the column headings used for the tracking table:

- *Layer Number* - is assigned beginning with layer number 1. Layer number 1 is always assigned for the subgrade and the last layer number is always the pavement surface layer.
- *Layer Description Code* - is used to describe the material layer. Valid codes for this project are:
 - Original Surface Layer 03
 - Base Coarse 05
 - Subgrade 07
 - Embankment (Fill) 11
- *Layer Type* - is used to classify the type of layer. Valid codes for this project are:
 - AC. for asphalt concrete layer
 - PC. for portland cement concrete layer
 - GB. for unbound (granular) base layer
 - GS. for unbound (granular) subbase layer (embankment)
 - SS. for subgrade layer
- *Test Section Number* - is the number of the test section for which the sample pertains.
- *Sample Location Number* - is the location the sample was taken and should be shown on sample tags and labels.
- *Sample Number* - is the number identifying each individual sample and should be shown on sample tags and labels.

- *Lab Test Number* - shall be assigned as per the following:
 - a. Beginning of the Section (Station 0-): samples of each layer that are retrieved from areas in the approach end of the test section (stations preceding 0+00) shall be assigned Laboratory Test Number '1'.
 - b. End of the Section (Stations 1+52.4): samples of each layer that are retrieved from areas in the leave end of the test section (stations after 1+52.4) shall be assigned Laboratory Test Number '2'.
 - c. Middle of the Section (Stations 0+00 to 1+52.4): samples of each layer that are retrieved from areas in the middle of the test section (from the paver) shall be assigned Laboratory Test Number '3'.
- *Required Laboratory Tests Per Layer* - order in which testing shall proceed.
- *Extra Sample* - is the sample to be saved as a backup for other tests? A "yes" in this column implies that this is a dedicated extra sample saved for future use. A "no" indicates that a sample can be discarded after use.
- *Sample Storage* - the following codes are used to specify the sample storage conditions for samples:
 - a. environmentally protected and controlled storeroom at 5-21°C
 - b. environmentally protected and controlled storeroom at 5-38°C
- *Sample Disposal?* - indicates whether or not a sample can be disposed of after testing. Generally all samples, or portions of samples that are not tested are saved until further notice.

Tables 23 through 27 and tables 28 through 31 should be completed (layer number), checked and modified as necessary to reflect the actual samples received and then submitted to Nichols Consulting Engineers for approval before any testing commences by the state testing lab and the FHWA-LTPP testing lab, respectively.

Table 23. Tracking table of **Natural Subgrade** testing in the **State Laboratory**, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	07	SS	060805	BZ1	BSZ01	1	No testing - samples stored				Yes	(b)	No
	07	SS	060806	BZ2	BSZ02	2	UG09/P48				No	(b)	No
	07	SS	060811	BZ3	BSZ03	1	No testing - samples stored				Yes	(b)	No
	07	SS	060812	BZ4	BSZ04	2	No testing - samples stored				Yes	(b)	No

¹Layer number to be completed by testing lab after reviewing field sampling logs.

Table 24. Tracking table of Prepared Embankment testing in the State Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	06	GS	060805	BZ5	BGZ05	1	No testing - samples stored				Yes	(b)	No
	06	GS	060806	BZ6	BGZ06	1	UG09/P48				No	(b)	No
	06	GS	060811	BZ7	BGZ07	1	No testing - samples stored				Yes	(b)	No
	06	GS	060812	BZ8	BGZ08	2	No testing - samples stored				No	(b)	Yes
	06	GS	060805	DZ1	JSZ01	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ02	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ03	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ04	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ05	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ06	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ07	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ08	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ09	3	SS12/P68				No	(b)	Yes
	06	GS	060805	DZ1	JSZ10	3	SS12/P68				No	(b)	Yes
	06	GS	060806	DZ2	JSZ11	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ12	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ13	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ14	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ15	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ16	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ17	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ18	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ19	3	SS12/P60				No	(b)	Yes
	06	GS	060806	DZ2	JSZ20	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ21	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ22	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ23	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ24	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ25	3	SS12/P60				No	(b)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

Table 24. Tracking table of **Prepared Embankment** testing in the **State Laboratory**, SPS-8 California. (cont'd)

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	06	GS	060811	DZ3	JSZ26	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ27	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ28	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ29	3	SS12/P60				No	(b)	Yes
	06	GS	060811	DZ3	JSZ30	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ31	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ32	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ33	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ34	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ35	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ36	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ37	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ38	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ39	3	SS12/P60				No	(b)	Yes
	06	GS	060812	DZ4	JSZ40	3	SS12/P60				No	(b)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

Table 25. Tracking table of **Class 2 Aggregate Base** testing in the **State Laboratory**, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	05	GB	060805	BZ09	BGZ09	1	UG09/P48				No	(b)	Yes
	05	GB	060806	BZ10	BGZ10	2	UG09/P48				No	(b)	Yes
	05	GB	060811	BZ11	BGZ11	1	UG09/P48				No	(b)	Yes
	05	GB	060812	BZ12	BGZ12	2	UG09/P48				No	(b)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

Table 26. Tracking table of Portland Cement testing in the State Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence					
							Required Laboratory Tests Per Layer			Extra Sample	Sample Storage	Sample Disposed ?
							First	Second	Third			
	3	PCC	060811	BZ16	GXZ01	3	PC01/P61 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ16	GYZ02	3	PC01/P61 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ16	GZZ03	3	PC01/P61 (1 year)			No	(a)	Yes
	3	PCC	060811	BZ16	GXZ04	3	PC02/P62 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ16	GYZ05	3	PC02/P62 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ16	GZZ06	3	PC02/P62 (1 year)			No	(a)	Yes
	3	PCC	060811	BZ16	FXZ01	3	PC09/P69 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ16	FYZ02	3	PC09/P69 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ16	FZZ03	3	PC09/P69 (1 year)			No	(a)	Yes
	3	PCC	060811	BZ17	GXZ07	3	PC01/P61 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ17	GYZ08	3	PC01/P61 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ17	GZZ09	3	PC01/P61 (1 year)			No	(a)	Yes
	3	PCC	060811	BZ17	GXZ10	3	PC02/P62 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ17	GYZ11	3	PC02/P62 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ17	GZZ12	3	PC02/P62 (1 year)			No	(a)	Yes
	3	PCC	060811	BZ17	FXZ04	3	PC09/P69 (14 day)			No	(a)	Yes
	3	PCC	060811	BZ17	FYZ05	3	PC09/P69 (28 day)			No	(a)	Yes
	3	PCC	060811	BZ17	FZZ06	3	PC09/P69 (1 year)			No	(a)	Yes
	3	PCC	060812	BZ18	GXZ13	3	PC01/P61 (14 day)			No	(a)	Yes
	3	PCC	060812	BZ18	GYZ14	3	PC01/P61 (28 day)			No	(a)	Yes
	3	PCC	060812	BZ18	GZZ15	3	PC01/P61 (1 year)			No	(a)	Yes
	3	PCC	060812	BZ18	GXZ16	3	PC02/P62 (14 day)			No	(a)	Yes
	3	PCC	060812	BZ18	GYZ17	3	PC02/P62 (28 day)			No	(a)	Yes
	3	PCC	060812	BZ18	GZZ18	3	PC02/P62 (1 year)			No	(a)	Yes
	3	PCC	060812	BZ18	FXZ07	3	PC09/P69 (14 day)			No	(a)	Yes
	3	PCC	060812	BZ18	FYZ08	3	PC09/P69 (28 day)			No	(a)	Yes
	3	PCC	060812	BZ18	FZZ09	3	PC09/P69 (1 year)			No	(a)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

²Run tests AE01/P21 - AE05/P25 on recovered asphalt cement and tests AG01/P11 - AG05/P14 (excluding test AG03) on extracted aggregate.

Table 26. Tracking table of Portland Cement testing in the State Laboratory, SPS-8 California. (cont'd)

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence					
							Required Laboratory Tests Per Layer			Extra Sample	Sample Storage	Sample Disposed ?
							First	Second	Third			
	03	PC	060811	CZ17	CPZ17	1	PC06/P66	PC05/P65	PC01/P61 (14 days)	No	(b)	Yes
	03	PC	060811	CZ18	CPZ18	1	PC06/P66	PC05/P65	PC01/P61 (28 days)	No	(b)	Yes
	03	PC	060811	CZ19	CPZ19	1	PC06/P66	PC04/P64 (28 day)		No	(b)	Yes
	03	PC	060811	CZ20	CPZ20	1	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
	03	PC	060811	CZ21	CPZ21	1	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
	03	PC	060811	CZ22	CPZ22	1	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
	03	PC	060811	CZ23	CPZ23	1	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
	03	PC	060811	CZ24	CPZ24	2	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes
	03	PC	060811	CZ25	CPZ25	2	PC06/P66	PC08/P68 (28 day)		No	(b)	Yes
	03	PC	060811	CZ26	CPZ26	2	PC06/P66	PC05/P65	PC01/P61 (14 days)	No	(b)	Yes
	03	PC	060811	CZ27	CPZ27	2	PC06/P66	PC05/P65	PC01/P61 (28 days)	No	(b)	Yes
	03	PC	060811	CZ28	CPZ28	2	PC06/P66	PC04/P64 (28 day)		No	(b)	Yes
	03	PC	060811	CZ29	CPZ29	2	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
	03	PC	060812	CZ30	CPZ30	1	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
	03	PC	060812	CZ31	CPZ31	1	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
	03	PC	060812	CZ32	CPZ32	1	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
	03	PC	060812	CZ33	CPZ33	1	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes
	03	PC	060812	CZ34	CPZ34	1	PC06/P66	Note 2		No	(b)	Yes
	03	PC	060812	CZ35	CPZ35	1	PC06/P66	PC05/P65	PC01/P61 (28 days)	No	(b)	Yes
	03	PC	060812	CZ36	CPZ36	2	PC06/P66	PC05/P65	PC01/P61 (14 days)	No	(b)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

²Run tests AE01/P21 - AE05/P25 on recovered asphalt cement and tests AG01/P11 - AG05/P14 (excluding test AG03) on extracted aggregate.

Table 26. Tracking table of Portland Cement testing in the State Laboratory, SPS-8 California. (cont'd)

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence					
							Required Laboratory Tests Per Layer			Extra Sample	Sample Storage	Sample Disposed ?
							First	Second	Third			
	03	PC	060812	CZ37	CPZ37	2	PC06/P66	PC04/P64(28 day)		No	(b)	Yes
	03	PC	060812	CZ38	CPZ38	2	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
	03	PC	060812	CZ39	CPZ39	2	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
	03	PC	060812	CZ40	CPZ40	2	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
	03	PC	060812	CZ41	CPZ41	2	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
	03	PC	060812	CZ42	CPZ42	2	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

²Run tests AE01/P21 - AE05/P25 on recovered asphalt cement and tests AG01/P11 - AG05/P14 (excluding test AG03) on extracted aggregate.

Table 27. Tracking table of Asphalt Concrete testing in the State Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence						
							Required Laboratory Tests Per Layer				Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth			
	3	AC	060806	CZ10	CAZ10	1	AC01/P01	AC02/P02			Yes	(a)	No
	3	AC	060806	CZ11	CAZ11	1	AC01/P01	AC02/P02			Yes	(a)	No
	3	AC	060806	CZ12	CAZ12	1	AC01/P01	AC02/P02			Yes	(a)	No
	3	AC	060805	BZ13	BAZ13	3	AC03/P03	AC04/P04	AC05/P05	2	No	(a)	Yes
	3	AC	060806	BZ14	BAZ14	3	AC03/P03	AC04/P04	AC05/P05	2	No	(a)	Yes
	3	AC	060806	BZ15	BAZ15	3	AC03/P03	AC04/P04	AC05/P05	2	No	(a)	Yes
	3	AC	060806	BZ13	BCZ13	3	AE02/P22	AE03/P23	AE04/P24	AE05/P25	No	(a)	Yes
	3	AC	060806	BZ14	BCZ14	3	AE02/P22	AE03/P23	AE04/P24	AE05/P25	No	(a)	Yes
	3	AC	060806	BZ15	BCZ15	3	AE02/P22	AE03/P23	AE04/P24	AE05/P25	No	(a)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

²Run tests AE01/P21 - AE05/P25 on recovered asphalt cement and tests AG01/P11 - AG05/P14 (excluding test AG03) on extracted aggregate.

Table 28. Tracking table of Natural Subgrade testing in the FHWA-LTPP Testing Contractor Laboratory, SPS-8 California.

Layer No ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence								
							Required Laboratory Tests Per Layer						Extra Sample	Sample Storage	Sample Disposed ⁹
							First	Second	Third	Fourth	Fifth	Sixth			
	07	SS	060805	BZ1	BSZ01	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46 ²	No	(b)	Yes
	07	SS	060806	BZ2	BSZ02	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46 ²	No	(b)	Yes
	07	SS	060811	BZ3	BSZ03	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46 ²	No	(b)	Yes
	07	SS	060812	BZ4	BSZ04	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46 ²	No	(b)	Yes
	07	SS	060805	BZ1	MSZ01	1	SS09/P49						No	(b)	Yes
	07	SS	060806	BZ2	MSZ02	2	SS09/P49						No	(b)	Yes
	07	SS	060811	BZ3	MSZ03	1	SS09/P49						No	(b)	Yes
	07	SS	060812	BZ4	MSZ04	2	SS09/P49						No	(b)	Yes

¹ Layer number to be completed by testing lab after reviewing field sampling logs

Table 29. Tracking table of Prepared Embankment testing in the FHWA-LTPP Testing Contractor Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No	Sample No	Lab Test No	Steps Involved in Laboratory Handling and Testing Sequence								
							Required Laboratory Tests Per Layer						Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth	Fifth	Sixth			
	06	GS	060805	BZ5	BGZ05	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	060806	BZ6	BGZ06	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	060811	BZ7	BGZ07	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	060812	BZ8	BGZ08	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46	No	(b)	Yes
	06	GS	060805	BZ5	MGZ05	1	SS09/P49						No	(b)	Yes
	06	GS	060806	BZ6	MGZ06	1	SS09/P49						No	(b)	Yes
	06	GS	060811	BZ7	MGZ07	1	SS09/P49						No	(b)	Yes
	06	GS	060812	BZ8	MGZ08	2	SS09/P49						No	(b)	Yes

¹ Layer number to be completed by testing lab after reviewing field sampling logs

Table 30. Tracking table of Class 2 Aggregate Base testing in the FHWA-LTPP Testing Contractor Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence								
							Required Laboratory Tests Per Layer						Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third	Fourth	Fifth	Sixth			
	05	GB	060805	BZ09	BGZ09	1	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
	05	GB	060806	BZ10	BGZ10	2	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
	05	GB	060811	BZ11	BGZ11	1	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
	05	GB	060812	BZ12	BGZ12	2	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
	05	GB	060805	BZ09	MGZ09	1	UG10/P49						No	(b)	Yes
	05	GB	060806	BZ10	MGZ10	2	UG10/P49						No	(b)	Yes
	05	GB	060811	BZ11	MGZ11	1	UG10/P49						No	(b)	Yes
	05	GB	060812	BZ12	MGZ12	2	UG10/P49						No	(b)	Yes

¹ Layer number to be completed by testing lab after reviewing field sampling logs.

Table 31. Tracking table of Asphaltic Concrete testing in the FHWA-LTPP Testing Contractor Laboratory, SPS-8 California.

Layer No. ¹	Layer Description Code	Layer Type	Test Section No.	Sample Location No.	Sample No.	Lab Test No.	Steps Involved in Laboratory Handling and Testing Sequence					
							Required Laboratory Tests Per Layer			Extra Sample	Sample Storage	Sample Disposed?
							First	Second	Third			
	03	AC	060805	CZ1	CAZ01	1	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ2	CAZ02	1	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ3	CAZ03	1	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ4	CAZ04	1	AC01/P01	AC02/P02	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	060805	CZ5	CAZ05	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ6	CAZ06	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ7	CAZ07	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060805	CZ8	CAZ08	2	AC01/P01	AC02/P02	AC07/P07 (ITS)	No	(a)	Yes
	03	AC	060806	CZ9	CAZ09	1	AC01/P01	AC02/P02	AC06/P06	No	(a)	Yes
	03	AC	060806	CZ13	CAZ13	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060806	CZ14	CAZ14	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060806	CZ15	CAZ15	2	AC01/P01	AC02/P02	AC07/P07	No	(a)	Yes
	03	AC	060806	CZ16	CAZ16	2	AC01/P01	AC02/P02	AC07/P07 (ITS)	No	(a)	Yes

¹Layer number to be completed by testing lab after reviewing field sampling logs.

Data Forms

Data forms and instructions for all field sampling and measurements described in this document are contained in "**Specific Pavement Studies, Materials Sampling and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads**". Copies of blank data forms are included in appendix A, and SHRP-LTPP Data Collection standard codes are provided in appendix B. These data forms must be completed at the time of the work. Completed forms shall be submitted to the designated LTPP representative.

APPENDIX A

SAMPLING DATA SHEETS, FIELD OPERATIONS INFORMATION FORMS
AND SPS-8 CONSTRUCTION DATA SHEETS

(Exclusively for SPS Experiments)

PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

SAMPLING DATA SHEET 2

SHRP REGION _____ STATE _____ STATE CODE _____
 SPS EXPERIMENT NO _____ SPS PROJECT CODE _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
 SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section FIELD SET NO. _____
 OPERATOR _____ EQUIPMENT USED _____ CORING DATE ____-____-____
 SAMPLING AREA NO SA-_____ CORE BARREL Size _____ Cooling Medium _____

Note: Record information for all cores extracted from each core hole in one column in the table below. Use a separate sheet for each sampling area. "Depth" should be measured from the pavement surface to the bottom of the core and recorded to the nearest tenth of an inch.

CORE HOLE NUMBER						
LOCATION: (a) STATION						
(b) OFFSET (Feet, O/S)						
Core Recovered?	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Replacement Core Hole No.						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	4/6	4/6	4/6	4/6	4/6	4/6
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

Field Crew Chief
Affiliation: _____

SHRP Representative
Affiliation: _____

_____-_____-19_____
Month- Day- Year

--A-TYPE BORE HOLE LOG

SAMPLING DATA SHEET 4-1

SHRP REGION _____ STATE _____ STATE CODE _____
 SPS EXPERIMENT NO _____ SPS PROJECT CODE _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
 SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section FIELD SET NO. 1
☐ Within Section

OPERATOR _____ EQUIPMENT USED _____ BORING DATE ____-____-____

SAMPLING AREA NO: SA-_____ LOCATION: STATION _____ OFFSET _____ feet from °/s

BORE HOLE NUMBER: _____ BORE HOLE SIZE: _____ (inch Diam.)

Scale (Inches)	Strata Change (Inches)	Sample Number (1)	#Blows(2)			Ref? Y/N (3)	DLR (Inches) (4)	IOP (5)	Material Description	Material Code
			6"	6"	6"					
<u>10.0</u>										
<u>20.0</u>										
<u>30.0</u>										
<u>40.0</u>										
<u>50.0</u>										

- Record sample numbers for splitspoon/thin-walled tube samples taken from the subgrade. For splitspoon samples, record the number of blows for the first, second and third 6 inches of penetration.
- Refused* - If the splitspoon is refused, place a Y in the *REFUSAL* column and complete *Driving Length To Refusal* column. Refusal is defined as less than 1 inch of penetration with 100 blows.
- Driving Length To Refusal* - Record penetration to refusal of splitspoon from the top of the pavement surface.
Inches Of Penetration - Record from start of splitspoon sampling procedure if 100 blows is reached before one foot of penetration. If penetration exceeds 12 inches before 100 blows is reached, enter middle 6 inches plus depth of penetration into the last 6 inches when 100 blows was reached (not including seating drive); record to nearest tenth of an inch.

GENERAL REMARKS: _____

CERTIFIED _____ VERIFIED AND APPROVED _____ DATE _____-____-19____
 Field Crew Chief _____ SHRP Representative _____ Month- Day- Year
 Affiliation: _____ Affiliation: _____

SHEET NUMBER OF

SAMPLING DATA SHEET 8-1

Note: Use additional sheets if necessary

DEPTH FROM SURFACE TO THE TOP OF THE LAYER, INCHES (From Plans)						
LAYER NUMBER						
MATERIAL TYPE: (Unbound=G Other=T)						
1						
IN SITU DENSITY, pcf 2						
3						
(AASHTO T238-86) 4						
AVERAGE						
Method (A,B,or C)						
Rod Depth, inches						
1						
IN SITU MOISTURE CONTENT, % 2						
3						
(AASHTO T239-86) 4						
AVERAGE						

GENERAL REMARKS:

DATE _____

_____-_____-19_____
Month- Day- Year

affiliation:

Affiliation:

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 10-1

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ STATE CODE _____
SPS EXPERIMENT NUMBER _____ SPS PROJECT CODE _____
ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
FIELD SET NO. 1

PERSON PERFORMING SAMPLING

NAME _____ EMPLOYER _____
TITLE _____

MIX PLANT

PLANT NAME _____
PLANT LOCATION _____
PLANT TYPE Batch..... 1 Drum..... 2 Other (Specify)..... 3 [____]
DESCRIPTION OF MIX PLANT _____
MANUFACTURER OF ASPHALT PLANT _____
MODEL NUMBER _____
BATCH SIZE _____

SAMPLING LOCATION [____]

Conveyor Belt..... 1 Stockpile..... 2 Haul Truck..... 3 Funnel Device..... 4
Roadway Prior to Compaction 5 Station ____ + ____ Offset ____ (feet from O/S)
Other..... 6 (specify) _____

MIX TYPE "Virgin" Asphalt Concrete (BV).. 1 Recycled Asphalt Concrete (BR).. 2 [____]
Asphalt Treated Dense Graded (BT).. 3 Permeable Asphalt Treated (BT).. 4 [____]

LAYER NUMBER [____]

LAYER TYPE BINDER COURSE ...3 SURFACE COURSE... 4 [____]
SURFACE FRICTION LAYER ... 5 BASE COURSE ... 6

SAMPLE NUMBER (MIX TYPE letter codes and sequential numbering) [____ _ _ _]

APPROXIMATE SAMPLE SIZE (lbs) _____

DATE SAMPLED (Month - Day - Year) [____ - ____ - ____]

LOCATION SAMPLE SHIPPED TO _____

DATE SHIPPED (Month-Day-Year) [____ - ____ - ____]

GENERAL REMARKS: _____

CERTIFIED _____ VERIFIED AND APPROVED _____ DATE _____
Field Crew Chief SHRP Representative _____ - ____ -19 ____
Affiliation: _____ Affiliation: _____ Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
SAMPLING FRESH PORTLAND CEMENT CONCRETE MIXTURES
SAMPLING DATA SHEET 11-1

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____
SPS EXPERIMENT NUMBER _____
ROUTE/HIGHWAY _____ Lane _____ Direction _____

STATE CODE _____
SPS PROJECT CODE _____
TEST SECTION NO. _____
FIELD SET NO. _____

PERSON PERFORMING SAMPLING

NAME _____ EMPLOYER _____
TITLE _____

SAMPLING LOCATION

Batch Plant 1 Hauling Truck before Paving 2
Hauling Truck during Paving 3 Paver 4
Other 5 (specify) _____

SAMPLE NUMBER (FC-- for PCC, BL-- for LCB) [_ _ _]

TIME SAMPLED (Military Time) [_ _ _]

DATE SAMPLED (Month - Day - Year) [_ _ - _ - _]

PCC MIX TEMPERATURE WHEN SAMPLED (°F) [_ _]

AMBIENT TEMPERATURE WHEN SAMPLED (°F) [_ _]

AIR CONTENT (PERCENT) [_ . _]

SLUMP (INCHES) [_ . _]

SPECIMENS FORMED FROM SAMPLE

SPECIMEN NUMBER

CYLINDERS

[G _ _ _] [G _ _ _]
[G _ _ _] [G _ _ _]
[G _ _ _] [G _ _ _]
[L _ _ _] [L _ _ _]
[L _ _ _] [L _ _ _]
[L _ _ _] [L _ _ _]

BEAMS

[F _ _ _] [F _ _ _]

LABORATORY ID CODE [_ _ _]

DATE SHIPPED [_ _ - _ - _]

NOTES : X denotes 14 day cure Y denotes 28 day cure Z denotes 365 day cure

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

-19__

Field Crew Chief

SHRP Representative

Month- Day- Year

Affiliation: _____

Affiliation: _____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING

SHEET NUMBER _____ OF _____

BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS

SAMPLING DATA SHEET 12

SHRP REGION _____ STATE _____ STATE CODE _____
 SPS EXPERIMENT NO. _____ SPS PROJECT CODE _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
 SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section FIELD SET NO. 1

TECHNICIAN _____ EQUIPMENT _____ EXPLORATION DATE ____-____-____

SAMPLING AREA NO: SA-_____ LOCATION: STATION _____ OFFSET _____ feet from °/s

SAMPLING LOCATION NUMBER _____

PIT SIZE: (a) Length _____ feet (b) Width _____ feet

LAYER NUMBER: _____ (SUBGRADE _____ GRADED AGGREGATE BASE _____)

Scale (Inches)	Strata Change (Inches)	Moisture Sample No.	Bulk Sample No.	Material Description	Material Code
4					
8					
12					
16					

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

Field Crew Chief
 Affiliation: _____

SHRP Representative
 Affiliation: _____

____-____-19____
 Month- Day- Year

SHEET NUMBER OF

FIELD OPERATIONS INFORMATION FORM 1

STATE CODE _____
SPS PROJECT CODE _____
TEST SECTION NO. _____
FIELD SET NO. _____

FIELD WORK COMPLETED ON - -

[illegible]

Lab No. (1) _____
 Lab No. (2) _____
 Lab No. (3) _____

GENERAL REMARKS:

DATE _____

_____-_____-19_____
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING

SHEET NUMBER _____ OF _____

SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

FIELD OPERATIONS INFORMATION FORM 2-3

SHRP REGION _____ STATE _____ STATE CODE _____
SPS EXPERIMENT NO. _____ SPS PROJECT CODE _____
ROUTE/HIGHWAY _____ Lane _____ Direction _____ TEST SECTION NO. _____
FIELD SET NO. _____

LABORATORY _____ WORK COMPLETED ON ____-____-____

NOTE: This is a summary of material samples sent to each laboratory based on the information from Field Operations Information Form 1. Complete one form for each laboratory that material samples were sent.

LAYER NO. (From Subgrade)	MATERIAL/SAMPLE TYPE	TOTAL NUMBER OF SAMPLES
4	PCC CORES:	4" Diameter _____
4	PCC Molded Cylinders	_____
4	PCC Molded Beams	_____
4	AC CORES:	4" Diameter _____
4	AC BULK SAMPLES: 100 Pound Samples	_____
3	UNBOUND BASE SAMPLES: (a) BAGS (BULK) _____ (b) JARS (MOISTURE) _____	
2	EMBANKMENT (FILL) SAMPLES: (a) BAGS (BULK) _____ (b) JARS (MOISTURE) _____	
1	SUBGRADE SAMPLES: (a) BAGS (BULK) _____ (b) JARS (MOISTURE) _____	
	(c) THIN-WALLED TUBES _____ (d) SPLITSPOON _____ JARS	

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

Field Crew Chief
Affiliation: _____

SHRP Representative
Affiliation: _____

_____-_____-19____
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING

SHEET NUMBER _____ OF _____

LABORATORY SHIPMENT SAMPLES INVENTORY - MOLDED CONCRETE

FIELD OPERATIONS INFORMATION FORM 3-1

SHRP REGION _____ STATE _____
 SPS EXPERIMENT NO _____
 ROUTE/HIGHWAY _____ Lane _____ Direction _____

STATE CODE _____
 SPS PROJECT CODE _____
 TEST SECTION NO. _____
 FIELD SET NO. _____

FIELD WORK COMPLETED ON ____-____-____

Note: Use one form for all fresh PCC samples collected for all sampling areas. Use additional sheets if necessary. Include "as actual" sampling location plan sheets with this material samples inventory.

SAMPLE LOCATION	SPECIMEN NUMBERS OF MOLDED SPECIMENS

LABORATORY ID CODE

[_ _ _ _]

MOLDED PCC SPECIMENS SENT TO LABORATORY

LAYER NO. (From Subgrade)	SPECIMEN TYPE	TOTAL NUMBER OF SAMPLES
<u>4</u>	PCC Molded Cylinders	_____
<u>4</u>	PCC Molded Beams	_____

GENERAL REMARKS: _____

CERTIFIED

VERIFIED AND APPROVED

DATE

Field Crew Chief
 Affiliation: _____

SHRP Representative
 Affiliation: _____

_____-_____-19_____
 Month- Day- Year

— SPS-8 CONSTRUCTION DATA SHEET 1 PROJECT IDENTIFICATION	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
--	--

- *1. DATE OF DATA COLLECTION OR UPDATE (Month/Year) [_ _ / _ _]
- *2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [_ _ .]
- *3. COUNTY OR PARISH [_ _ _ .]
4. FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [_ _ .]
- *5. ROUTE SIGNING (NUMERIC CODE) [_ .]
 Interstate... 1 U.S.... 2 State... 3
 Other... 4
- *6. ROUTE NUMBER [_ _ _ _ .]
7. TYPE OF PAVEMENT (01 for Granular Base, 02 for Treated Base) [_ _ .]
8. NUMBER OF THROUGH LANES (ONE DIRECTION) [_ .]
- *9. DATE OF CONSTRUCTION COMPLETION (Month/Year) [_ _ / _ _]
- *10. DATE OPENED TO TRAFFIC (Month/Year) [_ _ / _ _]
11. CONSTRUCTION COSTS PER LANE MILE (In \$1000) [_ _ _ _ .]
12. DIRECTION OF TRAVEL [_ .]
 East Bound... 1 West Bound... 2 North Bound... 3
 South Bound... 4
- PROJECT STARTING POINT LOCATION
- *13. MILEPOINT [_ _ _ . _ _]
- *14. ELEVATION [_ _ _ _]
- *15. LATITUDE [_ _ ° _ _ ' _ _ . _ _ "]
- *16. LONGITUDE [_ _ ° _ _ ' _ _ . _ _ "]
17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS): [_____]
 [_____]
 [_____]
18. HPMS SAMPLE NUMBER (HPMS ITEM 28) [_ _ _ _ _ _ _ _ _ _]
19. HPMS SECTION SUBDIVISION (HPMS ITEM 29) [_ .]

- SPS-8 CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
--	--

- *1. LANE WIDTH (FEET) [_ _ .]
2. MONITORING SITE LANE NUMBER [_ .]
 (LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER
 LANE 2 IS NEXT TO LANE 1, ETC.)
- *3. SUBSURFACE DRAINAGE LOCATION [_ .]
 Continuous Along Test Section... 1 Intermittent... 2 None... 3
- *4. SUBSURFACE DRAINAGE TYPE [_ .]
 No Subsurface Drainage... 1 Longitudinal Drains... 2
 Transverse Drains... 3 Drainage Blanket... 4 Well System... 5
 Drainage Blanket with Longitudinal Drains... 6
 Other (Specify)... 7 _____
- | SHOULDER DATA | INSIDE
<u>SHOULDER</u> | OUTSIDE
<u>SHOULDER</u> |
|--|---------------------------|----------------------------|
| *5. SURFACE TYPE [_ .] [_ .] | | |
| Turf... 1 Granular.... 2 Asphalt Concrete... 3 | | |
| Concrete... 4 Surface Treatment... 5 | | |
| Other (Specify)... 6 _____ | | |
| *6. TOTAL WIDTH (FEET) | [_ _ .] | [_ _ .] |
| *7. PAVED WIDTH (FEET) | [_ _ .] | [_ _ .] |
| 8. SHOULDER BASE TYPE (CODES-TABLE A.6) | [_ _ .] | [_ _ .] |
| 9. SURFACE THICKNESS (INCHES) | [_ _ . _] | [_ _ . _] |
| 10. SHOULDER BASE THICKNESS (INCHES) | [_ _ . _] | [_ _ . _] |
| 11. DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES) | | [_ . _] |
| 12. SPACING OF LATERALS (FEET) | | [_ _ .] |

SPS-6 CONSTRUCTION DATA
SHEET 3
REFERENCE PROJECT STATION TABLE

* STATE CODE []
* SPS PROJECT CODE []
* TEST SECTION NO. []

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER		*4 CUT-FILL TYPE
		*2 START	*3 END	
1	— — — — —	0 + 0 0	— — — — + — —	—
2	— — — — —	— — — — + — —	— — — — + — —	—
3	— — — — —	— — — — + — —	— — — — + — —	—
4	— — — — —	— — — — + — —	— — — — + — —	—
5	— — — — —	— — — — + — —	— — — — + — —	—
6	— — — — —	— — — — + — —	— — — — + — —	—
7	— — — — —	— — — — + — —	— — — — + — —	—
8	— — — — —	— — — — + — —	— — — — + — —	—
9	— — — — —	— — — — + — —	— — — — + — —	—
10	— — — — —	— — — — + — —	— — — — + — —	—
11	— — — — —	— — — — + — —	— — — — + — —	—
12	— — — — —	— — — — + — —	— — — — + — —	—
13	— — — — —	— — — — + — —	— — — — + — —	—
14	— — — — —	— — — — + — —	— — — — + — —	—
15	— — — — —	— — — — + — —	— — — — + — —	—
16	— — — — —	— — — — + — —	— — — — + — —	—
17	— — — — —	— — — — + — —	— — — — + — —	—
18	— — — — —	— — — — + — —	— — — — + — —	—
19	— — — — —	— — — — + — —	— — — — + — —	—
20	— — — — —	— — — — + — —	— — — — + — —	—

*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT

ROUTE	PROJECT STATION NO.	RAMPS		---INTERSECTION---		
		EXIT	ENT	STOP	SIGNAL	UNSIG
— — — — —	— — — — + — —	—	—	—	—	—
— — — — —	— — — — + — —	—	—	—	—	—
— — — — —	— — — — + — —	—	—	—	—	—

Note 1. Indicate the type of subgrade construction the test section is located on:
Cut... 1 Fill... 2 At-Grade... 3 Cut, Fill, and At-Grade Combo... 4

If a section contains any combination of cut, fill and at-grade portions (code 4 above), enter the specific details of the cut, fill and at-grade locations on SPS-8 Construction Data Sheet 15.

PREPARER _____ EMPLOYER _____ DATE _____

*5 DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [__ __ . __]
(Rock, Stone, Dense Shale)

NOTES:

1. Layer 1 is the subgrade soil, the highest numbered layer is the pavement surface.
2. Layer description codes:

Overlay.....01	Base Layer.....05	Porous Friction Course..09
Seal/Tack Coat.....02	Subbase Layer....06	Surface Treatment.....10
Original Surface.....03	Subgrade.....07	Embankment (Fill).....11
HMAC Layer (Subsurface).04	Interlayer.....08	
3. The material type classification codes are presented in Tables A.5, A.6, A.7 and A.8 of the Data Collection Guide for Long Term Pavement Performance Studies, dated January 17, 1990.
4. Enter the average thickness of each layer and the minimum, maximum and standard deviation of the thickness measurements, if known.

September 1992

SPS-8 CONSTRUCTION DATA SHEET 5 PLANT-MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES	* STATE CODE [] [] * SPS PROJECT CODE [] [] * TEST SECTION NO. [] []
--	--

*1. LAYER NUMBER (FROM SHEET 4) []

COMPOSITION OF COARSE AGGREGATE

	TYPE	PERCENT
--	------	---------

*2. Crushed Stone... 1 Gravel... 2 Crushed Gravel... 3 [] [] [] []

*3. Crushed Slag... 4 Manufactured Lightweight... 5 [] [] [] []

*4. Other (Specify)... 6 [] [] [] []

COMPOSITION OF FINE AGGREGATE

	TYPE	PERCENT
--	------	---------

*5. Natural Sand... 1 [] [] [] []

*6. Crushed or Manufactured Sand (From Crushed Gravel or [] [] [] []

*7. Stone... 2 Recycled Concrete... 3 [] [] [] []

Other (Specify)... 4 [] [] [] []

*8. TYPE OF MINERAL FILLER []

Stone Dust... 1 Hydrated Lime... 2 Portland Cement... 3

Fly Ash... 4

Other (Specify)... 5 [] [] [] []

BULK SPECIFIC GRAVITIES:

*9. Coarse Aggregate (AASHTO T85 or ASTM C127) [] [] [] []

*10. Fine Aggregate (AASHTO T84 or ASTM C128) [] [] [] []

*11. Mineral Filler (AASHTO T100 or ASTM D854) [] [] [] []

*12. Aggregate Combination (Calculated) [] [] [] []

13. Effective Specific Gravity of Aggregate Combination [] [] [] []
(Calculated)

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
-------------------	--------------	---------

14. Coarse [] [] [] [] [] []

15. Coarse [] [] [] [] [] []

16. Coarse [] [] [] [] [] []

17. Coarse and Fine - Combined [] [] [] [] [] []

18. POLISH VALUE OF COARSE AGGREGATES [] []
SURFACE LAYER ONLY (AASHTO T279, ASTM D3319)

SPS-8 CONSTRUCTION DATA
SHEET 6
PLANT-MIXED ASPHALT BOUND LAYERS
ASPHALT CEMENT PROPERTIES

* STATE CODE []
* SPS PROJECT CODE []
* TEST SECTION NO. []

- *1. LAYER NUMBER (FROM SHEET 4) []
- *2. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) []
(IF OTHER, SPECIFY) _____
- *3. SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14) []
(IF OTHER, SPECIFY) _____
4. SPECIFIC GRAVITY OF ASPHALT CEMENT []
(AASHTO T228)

GENERAL ASPHALT CEMENT PROPERTIES (If available from supplier)

5. VISCOSITY OF ASPHALT AT 140°F (POISES) []
(AASHTO T202)
6. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) []
(AASHTO T202)
7. PENETRATION AT 77°F (AASHTO T49) (TENTHS OF A MM) []
(100 g., 5 sec.)

ASPHALT MODIFIERS (SEE TYPE CODE, A.15)

- | | <u>TYPE</u> | <u>QUANTITY (%)</u> |
|--|-------------|---------------------|
| 8. MODIFIER #1 | [] | [] |
| 9. MODIFIER #2
(IF OTHER, SPECIFY) _____ | [] | [] |
| 10. DUCTILITY AT 77°F (CM)
(AASHTO T51) | | [] |
| 11. DUCTILITY AT 39.2°F (CM)
(AASHTO T51) | | [] |
| 12. TEST RATE FOR DUCTILITY MEASUREMENT
AT 39.2°F (CM/MIN) | | [] |
| 13. PENETRATION AT 39.2°F (AASHTO T49) (TENTHS OF A MM)
(200 g., 60 sec.) | | [] |
| 14. RING AND BALL SOFTENING POINT (AASHTO T53) (°F) | | [] |

NOTE: If emulsified or cutback asphalt was used, enter "N" in the spaces for "Original Asphalt Cement Properties".

January 1997

SPS-8 CONSTRUCTION DATA SHEET 7 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
--	--

- *1. LAYER NUMBER (FROM SHEET 4) [_]
- *2. TYPE OF SAMPLES [_]
SAMPLES COMPACTED IN LABORATORY... 1
SAMPLES TAKEN FROM TEST SECTION... 2
- *3. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS) [_ . _ _]
(AASHTO T209 OR ASTM D2041)

BULK SPECIFIC GRAVITY (ASTM D1188)
- *4. MEAN [_ . _ _] NUMBER OF TESTS [_ _ .]
5. MINIMUM [_ . _ _] MAXIMUM [_ . _ _]
6. STD. DEV. [_ . _ _]
- ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX)
(AASHTO T164 OR ASTM D2172)
- *7. MEAN [_ . _ _] NUMBER OF SAMPLES [_ _ .]
8. MINIMUM [_ . _ _] MAXIMUM [_ . _ _]
9. STD. DEV. [_ . _ _]
- PERCENT AIR VOIDS
- *10. MEAN [_ . _ _] NUMBER OF SAMPLES [_ _ .]
11. MINIMUM [_ . _ _] MAXIMUM [_ . _ _]
12. STD. DEV. [_ . _ _]
- *13. VOIDS IN MINERAL AGGREGATE (PERCENT) [_ _ . _]
- *14. EFFECTIVE ASPHALT CONTENT (PERCENT) [_ _ . _]
- *15. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) [_ _ _ _ .]
- *16. NUMBER OF BLOWS [_ _]
- *17. MARSHALL FLOW (HUNDREDTHS OF AN INCH) [_ _ _ _ .]
(AASHTO T245 OR ASTM D1559)
- *18. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) [_ _ _ .]
- *19. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH) [_ _ _ _ .]
(AASHTO T246 OR ASTM 1561)

PREPARER _____ EMPLOYER _____ DATE _____

SPS-8 CONSTRUCTION DATA SHEET 8 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	---

- *1. LAYER NUMBER (FROM SHEET 4) [__]
- *2. TYPE OF SAMPLES [__]
 SAMPLES COMPACTED IN LABORATORY... 1
 SAMPLES TAKEN FROM TEST SECTION... 2
- *3. TYPE ASPHALT PLANT [__]
 BATCH PLANT... 1 DRUM MIX PLANT... 2
 OTHER (SPECIFY)... 3 _____
- *4. TYPE OF ANTISTRIPPING AGENT USED [__ __]
 (SEE TYPE CODES, TABLE A.21)
 OTHER (SPECIFY) _____
- *5. AMOUNT OF ANTISTRIPPING AGENT USED LIQUID OR SOLID CODE [__]
- *6. (If liquid, enter code 1, and amount as percent of asphalt cement weight. If solid, enter code 2 and amount as percent of aggregate weight.) [__ __.]

September 1992

SPS-8 CONSTRUCTION DATA SHEET 9 PLANT-MIXED ASPHALT BOUND LAYERS PLACEMENT DATA	* STATE CODE [] [] * SPS PROJECT CODE [] [] * TEST SECTION NO. [] []
--	--

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [] [] - [] [] - [] []

*2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [] [] - [] [] - [] []

*3 ASPHALT CONCRETE PLANT AND HAUL

	Type	Name	Haul Distance (Mi)	Time (Min)	Layer Numbers
Plant 1	[]	[] [] [] []	[] [] []	[] []	[] [] []
Plant 2	[]	[] [] [] []	[] [] []	[] []	[] [] []
Plant 3	[]	[] [] [] []	[] [] []	[] []	[] [] []

Plant Type: Batch..... 1 Drum Mix.... 2 Other...3 Specify _____

4. MANUFACTURER OF ASPHALT CONCRETE PAVER _____

5. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER _____

6. SINGLE PASS LAYDOWN WIDTH (Feet) [] [] . []

7. AC BINDER COURSE LIFT
 Layer Number [] []
 Nominal First Lift Placement Thickness (Inches) [] . []
 Nominal Second Lift Placement Thickness (Inches) [] . []

8. AC SURFACE COURSE LIFT
 Layer Number [] []
 Nominal First Lift Placement Thickness (Inches) [] . []
 Nominal Second Lift Placement Thickness (Inches) [] . []

9. SURFACE FRICTION COURSE (If Placed)
 Layer Number [] []
 Nominal Placement Thickness (Inches) [] . []

10. TEST SECTION STATION OF TRANSVERSE JOINTS (within test section)
 Binder Course [] + [] []
 Surface Course [] + [] []
 Surface Friction Course [] + [] []

11. LOCATION OF LONGITUDINAL SURFACE JOINT []
 Between lanes.. 1 Within lane.. 2
 (specify offset from O/S feet) [] [] . []

12. SIGNIFICANT EVENTS DURING CONSTRUCTION (disruptions, rain, equip. problems, etc.) _____

SPS-8 CONSTRUCTION DATA SHEET 10 PLANT-MIXED ASPHALT BOUND LAYERS COMPACTION DATA	* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
--	--

- *1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [- -]
 *2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [- -]
 *3. LAYER NUMBER []
 *4. MIXING TEMPERATURE (°F) [- -]
 5. LAYDOWN TEMPERATURES (°F)
 Mean..... [- -] Number of Tests [- -]
 Minimum..... [- -] Maximum..... [- -]
 Standard Deviation... [- -]

ROLLER DATA

	Roller Code #	Roller Description	Gross Wt (Tons)	Tire Press. (psi)	Frequency (Vibr./Min)	Amplitude (Inches)	Speed (mph)
	6	A Steel-Whl Tandem	— — . —				
	7	B Steel-Whl Tandem	— — . —				
	8	C Steel-Whl Tandem	— — . —				
	9	D Steel-Whl Tandem	— — . —				
	10	E Pneumatic-Tired	— — . —				
	11	F Pneumatic-Tired	— — . —				
	12	G Pneumatic-Tired	— — . —				
	13	H Pneumatic-Tired	— — . —				
	14	I Single-Drum Vibr.	— — . —				
	15	J Single-Drum Vibr.	— — . —				
	16	K Single-Drum Vibr.	— — . —				
	17	L Single-Drum Vibr.	— — . —				
	18	M Double-Drum Vibr.	— — . —				
	19	N Double-Drum Vibr.	— — . —				
	20	O Double-Drum Vibr.	— — . —				
	21	P Double-Drum Vibr.	— — . —				
	22	Q Other					
	COMPACTION DATA		First Lift	Second Lift	Third Lift	Fourth Lift	
	BREAKDOWN						
	23	Roller Code (A-Q)	— —	— —	— —	— —	
	24	Coverages	— — .	— — .	— — .	— — .	
	INTERMEDIATE						
	25	Roller Code (A-Q)	— —	— —	— —	— —	
	26	Coverages	— — .	— — .	— — .	— — .	
	FINAL						
	27	Roller Code (A-Q)	— —	— —	— —	— —	
	28	Coverages	— — .	— — .	— — .	— — .	
	29	Air Temperature (°F)	— — — .	— — — .	— — — .	— — — .	
	30	Compacted Thickness (In)	— — .	— — .	— — .	— — .	
	31	Curing Period (Days)	— — .	— — .	— — .	— — .	

PREPARER _____

EMPLOYER _____

DATE _____

September 1992

SPS-8 CONSTRUCTION DATA SHEET 11 PLANT-MIXED ASPHALT BOUND LAYERS DENSITY AND PROFILE DATA	* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
---	---

1. NUCLEAR DENSITY MEASUREMENTS

LAYER TYPE	Binder Course	Surface Course	Surface Friction Layer
Measurement Method (A, B, C) ¹	—	—	—
Number of Measurement	— —	— —	— —
Average (pcf)	— — — .	— — — .	— — — .
Maximum (pcf)	— — — .	— — — .	— — — .
Minimum (pcf)	— — — .	— — — .	— — — .
Standard Deviation (pcf)	— — — .	— — — .	— — — .
Layer Number	— —	— —	— —

¹ Measurement Method Backscatter... A Direct Transmission... B Air Gap... C

2. MANUFACTURER OF NUCLEAR DENSITY GAUGE

3. NUCLEAR DENSITY GAUGE MODEL NUMBER

4. NUCLEAR DENSITY GAUGE IDENTIFICATION NUMBER

5. NUCLEAR GAUGE COUNT RATE FOR STANDARDIZATION

— — — — —

6. PROFILOGRAPH MEASUREMENTS

Profilograph Type California... 1 Rainhart... 2

Profile Index (Inches/Mile)

— — — — —

Interpretation Method Manual.. 1 Mechanical.. 2 Computer.. 3

— — — — —

Height of Blanking Band (Inches)

— . — . — .

Cutoff Height (Inches)

— . — . — .

7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO)

— — — — —

SPS-8 CONSTRUCTION DATA
SHEET 12
LAYER THICKNESS MEASUREMENTS

* STATE CODE [__ __]
* SPS PROJECT CODE [__ __]
* TEST SECTION NO. [__ __]

SHEET _____ OF _____

[illegible]

PREPARER _____ EMPLOYER _____ DATE _____

September 1992

SPS-8 CONSTRUCTION DATA SHEET 13 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
--	--

- *1. UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [_ _ - _ _ - _ _]
- *2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [_ _ - _ _ - _ _]
- *3. LAYER NUMBER (From Sheet 4) [_]

PRIMARY COMPACTION EQUIPMENT

- *4. CODE TYPE [_]

COMPACTION TYPE CODES

Pneumatic - Tired... 1 Steel Wheel Tandem... 2 Single Drum Vibr.... 3

Double Drum Vibr.... 4

Other (Specify)... 5 _____

- *5. GROSS WEIGHT (TONS) [_ _ . _]

- *6. LIFT THICKNESSES

Nominal First Lift Placement Thickness (inches) [_ _]

Nominal Second Lift Placement Thickness (inches) [_ _]

Nominal Third Lift Placement Thickness (inches) [_ _]

Nominal Fourth Lift Placement Thickness (inches) [_ _]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

7. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____
- _____
- _____
- _____

September 1992

SPS-8 CONSTRUCTION DATA SHEET 14 SUBGRADE PREPARATION	* STATE CODE [] [] * SPS PROJECT CODE [] [] * TEST SECTION NO. [] []
---	--

*1. SUBGRADE PREPARATION BEGAN (Month-Day-Year) [] [] - [] [] - [] []

*2. SUBGRADE PREPARATION COMPLETED (Month-Day-Year) [] [] - [] [] - [] []

PRIMARY COMPACTION EQUIPMENT

*3. CODE TYPE []

COMPACTION EQUIPMENT TYPE CODES

Sheepsfoot... 1 Pneumatic Tired... 2 Steel Wheel Tandem... 3

Single Drum Vibr.... 4 Double Drum Vibr.... 5

Other (Specify)... 6 _____

*4. GROSS WEIGHT (TONS) [] [] . []

	<u>TYPE</u>	<u>PERCENT</u>
*5. STABILIZING AGENT 1	[]	[] [] . []

*6. STABILIZING AGENT 2	[]	[] [] . []
-------------------------	-----	---------------

STABILIZING AGENT TYPE CODES

Portland Cement... 1 Lime... 2 Fly Ash, Class C... 3

Fly Ash, Class N... 4

Other (Specify)... 5 _____

*7. TYPICAL LIFT THICKNESS (INCHES) [] []
(For Fill Sections Only)

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

8. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

PREPARER

EMPLOYER

DATE

SPS-8 CONSTRUCTION DATA SHEET 15 CUT-FILL SECTION LOCATIONS	* STATE CODE () * SPS PROJECT CODE () * TEST SECTION NO. ()
---	---

ORDER	*1 CUT-FILL TYPE:	TEST SECTION STATION NUMBER	
		*2 START	*3 END
1	_____	0 + 0 0	— — — — + — —
2	_____	— — — — + — —	— — — — + — —
3	_____	— — — — + — —	— — — — + — —
4	_____	— — — — + — —	— — — — + — —
5	_____	— — — — + — —	— — — — + — —
6	_____	— — — — + — —	— — — — + — —
7	_____	— — — — + — —	— — — — + — —
8	_____	— — — — + — —	— — — — + — —
9	_____	— — — — + — —	— — — — + — —
10	_____	— — — — + — —	— — — — + — —

- NOTES:
1. Indicate the type of subgrade construction with one of the following:
Cut... 1 Fill... 2 At-Grade... 3
 2. Use one line for each cut, fill or at-grade zone present within the section boundaries.

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<p>SPS-8 CONSTRUCTION DATA SHEET 16 SUBGRADE EXCAVATION AND BACKFILLING SKETCH</p>	<p>* STATE CODE [][] * SPS PROJECT CODE [][] * TEST SECTION NO. [][]</p>
--	--

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SPS-8 CONSTRUCTION DATA SHEET 17 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA	* STATE CODE [][] * SPS PROJECT CODE [][] * TEST SECTION NO. [][]
---	---

- * 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) []
- * 2. AVERAGE CONTRACTION JOINT SPACING (Feet) [_ _ . _]
3. (RANDOM JOINT SPACING, IF ANY: _____)
- * 4. SKEWNESS OF JOINTS (ft/lane) [_ . _]
- * 5. TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM []
Round Dowels..... 1
Aggregate Interlock..... 2
Other (Specify) _____ 3
- * 6. ROUND DOWEL DIAMETER (Inches) [_ . _ _]
- * 7. DOWEL SPACING (Inches) [_ _ .]
8. DISTANCE OF NEAREST DOWEL FROM OUTSIDE LANE-SHOULDER EDGE (Inches) [_ _ . _]
9. DOWEL LENGTH (Inches) [_ _ .]
10. DOWEL COATING []
Paint and/or Grease..... 1
Plastic..... 2
Monel..... 3
Stainless Steel..... 4
Epoxy..... 5
Other (Specify) _____ 6
11. METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES []
Preplaced on Baskets..... 1
Mechanically Installed..... 2
Other (Specify) _____ 3
12. DOWEL ALIGNMENT CHECKED BEFORE PLACEMENT (Y/N) []
13. DOWEL ALIGNMENT CHECKED AFTER PLACEMENT (Y/N) []
- If Yes, describe method used _____
(e.g. Pachometer, Ground Penetrating Radar)

SPS-8 CONSTRUCTION DATA SHEET 18 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	--

- * 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [__]
- * 2. METHOD USED TO FORM TRANSVERSE JOINTS [__]
 Sawed..... 1 Metal Insert.....3
 Plastic Insert..... 2
 Other (Specify) _____ 4
- * 3. TYPE OF LONGITUDINAL JOINT (BETWEEN LANES) [__]
 Butt..... 1 Insert Weakened Plane..... 3
 Sawed Weakened Plane..... 2
 Other (Specify) _____ 4
- * 4. TYPE OF SHOULDER-TRAFFIC LANE JOINT [__]
 Butt..... 1 Insert Weakened Plane..... 3
 Sawed Weakened Plane..... 2
 Other (Specify) _____ 4
- *5. AVERAGE DEPTH OF SAWCUT, FROM MEASUREMENTS (Inches)..... [__. __]
- *6. TIME INTERVAL BETWEEN CONCRETE PLACEMENT AND SAWCUT (HOURS)..... [__ __.]
7. TRANSVERSE JOINT SEALANT TYPE (AS BUILT) [__]
 Preformed (Open Web)..... 1 Rubberized Asphalt..... 3
 Asphalt..... 2 Low-Modulus Silicone..... 4
 Other (Specify) _____ 5

TRANSVERSE JOINT SEALANT RESERVOIR (AS BUILT)

8. WIDTH, (Inches)..... [__. __]
9. DEPTH, (Inches)..... [__. __]

LONGITUDINAL JOINT SEALANT RESERVOIR (AS BUILT)

10. WIDTH, (Inches)..... [__. __]
11. DEPTH, (Inches)..... [__. __]
12. BETWEEN LANE TIE BAR DIAMETER (Inches) [__. __]
13. BETWEEN LANE TIE BAR LENGTH (Inches) [__ __.]
14. BETWEEN LANE TIE BAR SPACING (Inches) [__ __.]

SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT)

15. WIDTH, (Inches)..... [__. __]
16. DEPTH, (Inches)..... [__. __]

SPS-8 CONSTRUCTION DATA SHEET 19 PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA	* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
---	---

*1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) []

MIX DESIGN (OVEN DRIED WEIGHT - PER CUBIC YARD)

*2. Coarse Aggregate (Pounds)..... []

*3. Fine Aggregate (Pounds)..... []

*4. Cement (Pounds)..... []

*5. Water (Pounds)..... []

*6. TYPE CEMENT USED (See Cement Type Codes, Table A.11) []
(If Other, Specify _____)

*7. ALKALI CONTENT OF CEMENT, (PERCENT BY WEIGHT OF CEMENT) []

ADMIXTURES (PERCENT BY WEIGHT OF CEMENT)

	<u>TYPE CODE</u>	<u>AMOUNT</u>
*8. ADMIXTURE #1	[]	[]
*9. ADMIXTURE #2	[]	[]
*10. ADMIXTURE #3	[]	[]

(See Cement Admixture Codes, Table A.12)
(If Other, Specify _____)

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	<u>TYPE OF AGGREGATE</u>	<u>TYPE OF TEST</u>	<u>RESULTS</u>
11.	Coarse	[]	[]
12.	Coarse	[]	[]
13.	Coarse	[]	[]
14.	Coarse and Fine	[]	[]

SPS-8 CONSTRUCTION DATA SHEET 20 PORTLAND CEMENT CONCRETE LAYERS MIXTURE DATA (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
--	---

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [__]

COMPOSITION OF COARSE AGGREGATE

TYPE PERCENT

* 2. [__] [__ __ __.]

* 3. [__] [__ __ __.]

* 4. [__] [__ __ __.]

Crushed Stone.... 1 Manufactured gravel..... 2 Crushed Gravel..... 3
 Crushed Slag..... 4 Lightweight..... 5 Recycled Concrete... 6
 Other (Specify)_____ 7

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [__ __.]
 (SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE

TYPE PERCENT

* 6. [__] [__ __ __.]

* 7. [__] [__ __ __.]

* 8. [__] [__ __ __.]

Natural Sand... 1
 Crushed, Manufactured Sand (From Crushed Gravel or Stone)... 2
 Recycled Concrete... 3 Other (Specify)_____ 4

9. INSOLUBLE RESIDUE, PERCENT (ASTM D3042) [__ __ __.]

10. GRADATION OF COARSE AGGREGATE

11. GRADATION OF FINE AGGREGATE

<u>Sieve Size</u>	<u>% Passing</u>
2".....	___ __ __
1 1/2"....	___ __ __
1".....	___ __ __
7/8".....	___ __ __
3/4".....	___ __ __
5/8".....	___ __ __
1/2".....	___ __ __
3/8".....	___ __ __
No. 4.....	___ __ __

<u>Sieve Size</u>	<u>% Passing</u>
No. 8.....	___ __ __
No. 10....	___ __ __
No. 16....	___ __ __
No. 30....	___ __ __
No. 40....	___ __ __
No. 50....	___ __ __
No. 80....	___ __ __
No. 100...	___ __ __
No. 200...	___ __ __

BULK SPECIFIC GRAVITIES:

12. Coarse Aggregate (AASHTO T85 or ASTM C127) [__ . __ __ __]

13. Fine Aggregate (AASHTO T84 or ASTM C128) [__ . __ __ __]

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SPS-8 CONSTRUCTION DATA SHEET 21 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA	* STATE CODE [][] * SPS PROJECT CODE [][] * TEST SECTION NO. [][]
--	---

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) []-[]-[]

*2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) []-[]-[]

*3. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) []

*4. CONCRETE MIX PLANT AND HAUL

	<u>Name</u>	<u>Haul Distance (Mi)</u>	<u>Time (Min)</u>
Plant 1	_____	[][]	[][]
Plant 2	_____	[][]	[][]
Plant 3	_____	[][]	[][]

*5. PAVER TYPE []
Slip Form Paver.... 1 Side Form... 2
Other (Specify) _____ 3

6. PAVER MANUFACTURER AND MODEL NUMBER _____

7. SPREADER TYPE (if applicable) _____

8. SPREADER MANUFACTURER AND MODEL NUMBER _____

9. WIDTH PAVED IN ONE PASS (Feet) []-[]

10. DOWEL PLACEMENT METHOD []
Dowel Bar Inserter (DBI)..... 1 Dowel Basket..... 2

11. NUMBER OF VIBRATORS [][]

12. VIBRATOR SPACING (Inches) [][]

13. DEPTH OF VIBRATORS BELOW SURFACE (Inches) []-[]

14. ADDITIONAL VIBRATION APPLIED _____

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SPS-8 CONSTRUCTION DATA SHEET 22 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA (CONTINUED)	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
--	--

1. CONSOLIDATION OF MATERIALS [_]
Internal Vibrators... 1 Vibrating Screeds... 2 Troweling... 3
Rolling... 4 Tamping... 5
Other (Specify)... 6 _____
2. FINISHING [_]
Screeding... 1 Hand-Troweling... 2 Machine-Troweling... 3
Other (Specify)... 4 _____
3. CURING [_]
Membrane Curing Compound..... 1 Burlap-Polyethylene Blanket... 5
Burlap Curing Blankets..... 2 Cotton Mat Curing..... 6
Waterproof Paper Blankets..... 3 Hay..... 7
White Polyethylene Sheeting... 4
Other (Specify)_____ 8
4. TEXTURING [_]
Tine..... 1 Grooved Float..... 4
Broom..... 2 Astro Turf..... 5
Burlap Drag..... 3 None..... 6
Other (Specify)_____ 7

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SPS-8 CONSTRUCTION DATA SHEET 23 PORTLAND CEMENT CONCRETE SURFACE LAYER PROFILE DATA	* STATE CODE [] * SPS PROJECT CODE [] * TEST SECTION NO. []
---	--

1. DATE PROFILE MEASURED (Month-Day-Year) [] - [] - []
2. PROFILOGRAPH TYPE California... 1 Rainhart... 2 []
3. PROFILE INDEX (Inches/Mile) []
4. INTERPRETATION METHOD Manual... 1 Mechanical... 2 Computer... 3 []
5. HEIGHT OF BLANKING BAND (Inches) [] . []
6. CUTOFF HEIGHT (Inches) [] . []
7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) []
8. WAS SURFACE PROFILE CORRECTED BY DIAMOND GRINDING? (YES, NO) []
- IF YES COMPLETE THE FOLLOWING:
9. DATE DIAMOND GRINDING OPERATIONS BEGAN (Month-Day-Year) [] - [] - []
10. DATE DIAMOND GRINDING OPERATIONS COMPLETED (Month-Day-Year) [] - [] - []
- *11. REASON FOR GRINDING []
Elimination of Faulting... 1 Elimination of Slab Warping... 2
Improve Skid Resistance... 3
Restoration of Transverse Drainage Slope... 4
Correction of Construction Deficiencies... 5
Other (Specify)... 6 _____
12. AVERAGE DEPTH OF CUT (Inches) [] . []
13. CUTTING HEAD WIDTH (Inches) [] [] . []
14. AVERAGE GROOVE WIDTH (Inches) [] . []
15. AVERAGE SPACING BETWEEN BLADES (Inches) [] . []

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SPS-8 CONSTRUCTION DATA SHEET 24 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [] [] * SPS PROJECT CODE [] [] * TEST SECTION NO. [] []
---	--

1. DATE PATCHING OPERATIONS BEGAN (Month-Day-Year) [] [] - [] [] - [] []
2. DATE PATCHING OPERATIONS COMPLETED (Month-Day-Year) [] [] - [] [] - [] []
3. PRIMARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [] []
(See Table A.22 for Type Codes)
Other (Specify) _____
4. SECONDARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [] []
(See Table A.22 for Type Codes)
Other (Specify) _____
5. PATCHES

	NUMBER	SQ. FEET
SLAB ONLY	[] []	[] [] [] []
SLAB AND BASE	[] []	[] [] [] []
6. PATCH MATERIAL USED []
Portland Cement Concrete... 1 Polymer Concrete... 2 Epoxy Mortar... 3
Other (Specify)... 4 _____
7. SLABS REPLACED

	NUMBER	SQ. FEET
SLAB ONLY	[] []	[] [] [] []
SLAB AND BASE	[] []	[] [] [] []
8. METHOD FOR PATCH BOUNDARY DETERMINATION []
Visual... 1 Coring... 2 Deflection... 3
State Standard or Specification... 4
Other (Specify)... 5 _____
9. CUTTING INSTRUMENT []
Diamond Blade Saw... 1 Carbide Blade Saw... 2 Wheel Saw... 3
Air Hammer... 4
Other (Specify)... 5 _____

SPS-8 CONSTRUCTION DATA SHEET 25 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]
---	---

1. SECURING LOAD TRANSFER DEVICES [__]
 None... 1 Grout Filler... 2 Epoxy filler... 3
 Other... 4 _____

2. REINFORCING STEEL PLACED IN PATCH [__]
 No... 1 Yes... 2

	<u>Temperature Steel</u>			
	<u>Transverse</u>	<u>Longitudinal</u>	<u>Dowel Bars</u>	<u>Tie Bars</u>
3. REBAR NUMBER DESIGNATION	[__ __]	[__ __]	[__ __]	[__ __]
4. BAR LENGTHS, Inches	[__ __ .__]	[__ __ .__]	[__ __ .__]	[__ __ .__]
5. BAR SPACING, Inches	[__ __ .__]	[__ __ .__]	[__ __ .__]	[__ __ .__]

6. DOWEL COATINGS [__]
 None... 1 Paint and/or Grease... 2 Plastic... 3
 Monel... 4 Stainless Steel... 5 Epoxy... 6
 Other (Specify)... 7 _____

7. NUMBER OF SAW CUTS PER PATCH (If Sawed) [__ __]

8. DEPTH OF TYPICAL BOUNDARY SAW CUT, Inches [__ __ .__]

9. CONCRETE BREAKUP [__]
 None... 1 Pneumatic Air Hammer... 2 Gravity Drop Hammer... 3
 Sawing... 4
 Other (Specify)... 5 _____

10. REMOVAL OF CONCRETE [__]
 Concrete Breakup and Cleanout... 1 Lift Out Intact Slab Section... 2
 Other (Specify)... 3 _____

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SPS-8 CONSTRUCTION DATA SHEET 26 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)	* STATE CODE [][] * SPS PROJECT CODE [][] * TEST SECTION NO. [][]
---	---

1. METHOD OF REINFORCING STEEL PLACEMENT []
Chairs... 1 Between Layers of Concrete... 2
2. MIXTURE DESIGN FOR PCC PATCH MATERIAL (lb./Cubic Yard)
Coarse Aggregate [][][][]
Fine Aggregate [][][][]
Cement [][][][]
Water (Gallons/Cubic Yard) [][][][]
3. CEMENT TYPE USED [][]
(See Type Codes, Table A.11)
4. AIR CONTENT (Percent by Volume)
Mean [][][]
Range [][][] to [][][]
5. ADMIXTURES [][]
(See Cement Additive Codes, Table A.12)
6. SLUMP (Inches)
Mean [][][]
Range [][][] to [][][]
7. FLEXURAL STRENGTH (MODULUS OF RUPTURE) (psi) [][][][]
(Based on 3rd Point Loading) Curing Time, Days [][]
If Unavailable, and Other Strength Test Conducted,
Enter Alternate Test [][][][][]
Type of Loading [][][][][]
Age, Days [][]; Strength, psi [][][][]
8. AMBIENT CONDITIONS AT TIME OF PATCHING
Air Temperature °F LOW [][][] HIGH [][][]
Surface Moisture - Dry = 1, Wet = 2 [][]
9. MAXIMUM SIZE OF COARSE AGGREGATE (Inches) [][]
10. CONSOLIDATION OF MATERIALS []
Internal Vibrators... 1 Vibrating Screeds... 2 Troweling... 3
Rolling... 4 Tamping... 5
Other (Specify)... 6 _____
12. FINISHING []
Screeding... 1 Hand-Troweling... 2 Machine-Troweling... 3
Other (Specify)... 4 _____

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SPS-8 CONSTRUCTION DATA SHEET 27 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)	* STATE CODE [_ _] * SPS PROJECT CODE [_ _] * TEST SECTION NO. [_ _]
---	--

1. JOINT FORMING METHOD
- | | SHOULDER | TRANSVERSE | LONGITUDINAL |
|----------------------------|--------------------------------|-----------------------|--------------|
| | [] | [] | [] |
| None... 1 | Polyethylene Strip Insert... 2 | Styrofoam Insert... 3 | |
| Fiberboard Insert... 4 | Sawing... 5 | Forms... 6 | |
| Other (Specify)... 7 _____ | | | |
2. WAS BOND BREAKER USED BETWEEN ADJACENT LANES? []
- Yes... 1 No... 2
3. CURING METHOD
- | METHOD 1 | [] [] |
|----------------------------------|-----------------------------------|
| METHOD 2 | [] [] |
| None... 1 | Membrane Curing Compound... 2 |
| Burlap Curing Blankets... 3 | Waterproof Paper Blankets... 4 |
| White Polyethylene Sheeting... 5 | Burlap-Polyethylene Blankets... 6 |
| Insulating Layers... 7 | Cotton Mat Curing... 8 Hay... 9 |
| Other (Specify)... 10 _____ | |
4. APPROXIMATE TYPICAL TIME BETWEEN PATCHING AND OPENING TO TRAFFIC, HOURS [] [].]
5. TYPE OF TRANSVERSE JOINTS IN PATCHES ____ OR SLABS ____
- | | | |
|--|---------------------------|-----------------------------|
| None... 1 | All Expansion Joints... 2 | All Contraction Joints... 3 |
| Mixture of Expansion and Contraction Joints... 4 | | |
6. WERE OLD JOINTS MATCHED? []
- Yes... 1 No... 2

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SPS-8 CONSTRUCTION DATA	* STATE CODE	[_ _]
SHEET 28	* SPS PROJECT CODE	[_ _]
MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS	* TEST SECTION NO.	[_ _]

Provide any miscellaneous comments and notes concerning construction operations which may have an influence on the ultimate performance of the test sections or which may cause undesired performance differences to occur between test sections. Also include any quality control measurements or data for which space is not provided on other forms. Provide an indication of the basis for such measurements, such as an ASTM, AASHTO, or Agency standard test designation.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

APPENDIX B

SHRP-LTPP DATA COLLECTION STANDARD CODES

(Reproduced from Appendix A of the SHRP-LTPP Data Collection Guide)

Revised August 30, 1989

APPENDIX A. STANDARD CODES

This appendix provides standard codes to simplify entry of data during collection and the subsequent storage and processing of this data. These codes are tabulated as follows:

Table A.1	Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates, and Canadian Provinces
Table A.2	Functional Class Codes
Table A.3	Experiment Type Definitions for LTPP
Table A.4	Pavement Type Codes
Table A.5	Pavement Surface Material Type Classification Codes
Table A.6	Base and Subbase Material Type Classification Codes
Table A.7	Subgrade Soil Description Codes
Table A.8	Material Type Codes for Thin Seals and Interlayers
Table A.9	Geologic Classification Codes
Table A.10	Soil Type Codes, AASHTO Soil Classification
Table A.11	Portland Cement Type Codes
Table A.12	Portland Cement Concrete Admixture Codes
Table A.13	Aggregate Durability Test Type Codes
Table A.14	Asphalt Refiners and Processors in the United States
Table A.15	Asphalt Cement Modifier Codes
Table A.16	Grades of Asphalt, Emulsified Asphalt, and Cutback Asphalt Codes
Table A.17	Maintenance and Rehabilitation Work Type Codes
Table A.18	Maintenance Location Codes
Table A.19	Maintenance Materials Type Codes
Table A.20	Recycling Agent Type Codes
Table A.21	Anti-Stripping Agent Type Codes
Table A.22	Distress Types

Revised June 13, 1988

Table A.1. Table of Standard Codes for States, District of Columbia,
Puerto Rico, American Protectorates and Canadian Provinces.

<u>State</u>	<u>Code</u>	<u>State</u>	<u>Code</u>
Alabama	01	New York	36
Alaska	02	North Carolina	37
Arizona	04	North Dakota	38
Arkansas	05	Ohio	39
California	06	Oklahoma	40
Colorado	08	Oregon	41
Connecticut	09	Pennsylvania	42
Delaware	10	Rhode Island	44
District of Columbia	11	South Carolina	45
Florida	12	South Dakota	46
Georgia	13	Tennessee	47
Hawaii	15	Texas	48
Idaho	16	Utah	49
Illinois	17	Vermont	50
Indiana	18	Virginia	51
Iowa	19	Washington	53
Kansas	20	West Virginia	54
Kentucky	21	Wisconsin	55
Louisiana	22	Wyoming	56
Maine	23	American Samoa	60
Maryland	24	Guam	66
Massachusetts	25	Puerto Rico	72
Michigan	26	Virgin Islands	78
Minnesota	27	Alberta	81
Mississippi	28	British Columbia	82
Missouri	29	Manitoba	83
Montana	30	New Brunswick	84
Nebraska	31	Newfoundland	85
Nevada	32	Nova Scotia	86
New Hampshire	33	Ontario	87
New Jersey	34	Prince Edward Island	88
New Mexico	35	Quebec	89
		Saskatchewan	90

Note: The U.S. codes are consistent with the Federal
Information Processing Standards (FIPS) and HPMS

Table A.2. Functional class codes.

<u>Functional Class</u>	<u>Code</u>
Rural:	
Principal Arterial - Interstate.....	01
Principal Arterial - Other.....	02
Minor Arterial.....	06
Major Collector.....	07
Minor Collector.....	08
Local Collector.....	09
Urban:	
Principal Arterial - Interstate.....	11
Principal Arterial - Other Freeways or Expressways.....	12
Other Principal Arterial.....	14
Minor Arterial.....	16
Collector.....	17
Local.....	19

Note: These codes are consistent with the HPMS system.

Table A.3. Detailed Descriptions of Pavements for Each LTPP
General Pavement Studies Experiment.

(01) ASPHALT CONCRETE PAVEMENT WITH GRANULAR BASE

Acceptable pavements for this study include a dense-graded hot mix asphalt concrete (HMAC) surface layer (1), with or without other HMAC layers (28), placed over untreated granular base (22 or 23). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present, but are not required. Two or more consecutive lifts of the same mixture design are to be treated as one layer. "Full depth" asphalt concrete pavements are also included in this study. They include an HMAC surface layer (1) and usually one or more HMAC layers (28) beneath the surface, with a minimum total HMAC thickness of 8 inches placed directly upon treated or untreated subgrade. For "full depth" asphalt concrete pavements, a base layer (Layer Description 5) of zero thickness and material code 21 should be indicated. If a treated subgrade (42 or 43) is present, it should be shown as a subbase (Layer Description 6). Seal coats or porous friction courses are allowed on the surface, but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Seal coats are also permissible on top of granular base layers. At least one layer of dense graded HMAC is required, regardless of the existence of seal coats or porous friction courses.

(02) ASPHALT CONCRETE PAVEMENT WITH BOUND BASE

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28), placed over a bound base layer (27-39, 42-44, 46). To properly account for a variety of bound base types in the sampling design, two classifications of binder types, bituminous and non-bituminous, are defined as the factor levels. Bituminous binders include asphalt cements, cutbacks, emulsions, and road tars. Non-bituminous binders include all hydraulic cements (those which harden by a chemical reaction with water and are capable of hardening under water), lime, fly ashes and natural pozzolans, or combinations thereof. Stabilized bases with lower quality materials such as sand asphalt or soil cement are also allowed. Stabilization practices of primary concern for this study are those in which the structural characteristics of the material are improved due to the cementing action of the stabilizing agent. Thus, the description of the study actually refers to treatments improving the structural properties of the base materials. Two or more consecutive lifts of the same mixture design are to be treated as one layer. One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may be present but are not required. Seal coats or porous friction courses are permitted on the surface but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Project selection is often to those constructed on both fine and coarse subgrades (51-65).

Revised June 13, 1988

Table A.3. Detailed Descriptions of Pavements for Each LTPP
General Pavement Studies Experiment (Continued).

(07) AC OVERLAY OF JOINTED CONCRETE PAVEMENT

Acceptable pavements for this study include a dense-graded HMA surface layer (1) with or without other HMA layers (28) placed on either a JPCP (4), JRCP (5), or CRCP (6). The slab may rest on any combination of base and/or subbase layers indicated in Table A.6 (except 45). The previously existing concrete slab may also have been placed directly on lime or cement treated fine or coarse-grained subgrade (27, 42, and 43), or on untreated coarse-grained subgrade (57-65). Slabs placed directly on untreated fine-grained subgrade (51-56) are not acceptable. Seal coats or porous friction courses are permissible, but not in combination. Fabric interlayers (75 or 76) and SAMIs (77) are acceptable when placed between the original surface (concrete) and the overlay. Overlaid pavements with aggregate interlayers (79) and open-graded asphalt concrete (80) will not be considered in this study. The total thickness of HMA used in the overlay must be at least 1.5 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(09) UNBONDED JCP OVERLAYS OF CONCRETE PAVEMENT

Acceptable projects for this study include unbonded JPCP (4), JRCP (5), or CRCP (6) overlay with a thickness of 5 inches or more placed over an existing JPCP (4), JRCP (5), or CRCP (6) pavement. The overlaid concrete pavement may rest on any of the base and subbase types listed in Table A.6 or directly upon subgrade.

Table A.4 Pavement Type Codes

<u>Type of Pavement</u>	<u>Code</u>
<u>Asphalt Concrete (AC) Surfaced Pavements:</u>	
AC With Granular Base.....	01
AC With Bituminous Treated Base.....	02
AC With Non-Bituminous Treated Base.....	07
AC Overlay on AC Pavement.....	03
AC Overlay on JPCP Pavement.....	28
AC Overlay on JRCP Pavement.....	29
AC Overlay on CRCP Pavement.....	30
Other.....	10
<u>Portland Cement Concrete Surfaced Pavements:</u>	
JPCP - Placed Directly On Untreated Subgrade.....	11
JRCP - Placed Directly On Untreated Subgrade.....	12
CRCP - Placed Directly On Untreated Subgrade.....	13
JPCP - Placed Directly On Treated Subgrade.....	14
JRCP - Placed Directly On Treated Subgrade.....	15
CRCP - Placed Directly On Treated Subgrade.....	16
JPCP - Over Unbound Base.....	17
JRCP - Over Unbound Base.....	18
CRCP - Over Unbound Base.....	19
JPCP Over Bituminous Treated Base.....	20
JRCP Over Bituminous Treated Base.....	21
CRCP Over Bituminous Treated Base.....	22
JPCP Over Non-Bituminous Treated Base.....	23
JRCP Over Non-Bituminous Treated Base.....	24
CRCP Over Non-Bituminous Treated Base.....	25
JPCP Overlay on JPCP Pavement.....	31
JPCP Overlay on JRCP Pavement.....	33
JPCP Overlay on CRCP Pavement.....	35
JRCP Overlay on JPCP Pavement.....	32
JRCP Overlay on JRCP Pavement.....	34
JRCP Overlay on CRCP Pavement.....	36
CRCP Overlay on JPCP Pavement.....	38
CRCP Overlay on JRCP Pavement.....	39
CRCP Overlay on CRCP Pavement.....	37
JPCP Overlay on AC Pavement.....	04
JRCP Overlay on AC Pavement.....	05
CRCP Overlay on AC Pavement.....	06
Prestressed Concrete Pavement.....	40
Other.....	49

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Table A.4 Pavement Type Codes
(Continued)

*Composite Pavements (Wearing Surface Included in Initial Construction:

JPCP With Asphalt Concrete Wearing Surface.....	51
JRCP With Asphalt Concrete Wearing Surface.....	52
CRCP With Asphalt Concrete Wearing Surface.....	53
Other.....	59

Definitions:

- JPCP - Jointed Plain Concrete Pavement
- JRCP - Jointed Reinforced Concrete Pavement
- CRCP - Continuously Reinforced Concrete Pavement

* "Composite Pavements" are pavements originally constructed with an asphalt concrete wearing surface over a portland cement concrete slab (1986 "AASHTO Guide for Design of Pavement Structures").

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Table A.5 Pavement Surface Material Type Classification Codes

<u>Material Type</u>	<u>Code</u>
Hot Mixed, Hot Laid Asphalt Concrete, Dense Graded.....	01
Hot Mixed, Hot Laid Asphalt Concrete, Open Graded (Porous Friction Course)	02
Sand Asphalt.....	03
Portland Cement Concrete (JPCP).....	04
Portland Cement Concrete (JRCP).....	05
Portland Cement Concrete (CRCP).....	06
Portland Cement Concrete (Prestressed).....	07
Portland Cement Concrete (Fiber Reinforced).....	08
Plant Mix (Emulsified Asphalt) Material, Cold Laid.....	09
Plant Mix (Cutback Asphalt) Material, Cold Laid.....	10
Single Surface Treatment.....	11
Double Surface Treatment.....	12
Recycled Asphalt Concrete Hot, Central Plant Mix.....	13
Cold Laid Central Plant Mix.....	14
Cold Laid Mixed-In-Place.....	15
Heater Scarification/Recompaction.....	16
Recycled Portland Cement Concrete JPCP.....	17
JRCP.....	18
CRCP.....	19
Other.....	20

Table A.6. Base and subbase material type classification codes.

	<u>Code</u>
No Base (Pavement Placed Directly on Subgrade).....	21
Gravel (Uncrushed).....	22
Crushed Stone, Gravel or Slag.....	23
Sand.....	24
Soil-Aggregate Mixture (Predominantly Fine-Grained Soil).	25
Soil-Aggregate Mixture (Predominantly Coarse-Grained Soil).....	26
Soil Cement.....	27
Asphalt Bound Base or subbase Materials	
Dense Graded, Hot Laid, Central Plant Mix.....	28
Dense Graded, Cold Laid, Central Plant Mix.....	29
Dense Graded, Cold Laid, Mixed In-Place.....	30
Open Graded, Hot Laid, Central Plant Mix.....	31
Open Graded, Cold Laid, Central Plant Mix.....	32
Open Graded, Cold Laid, Mixed In-Place.....	33
Recycled Asphalt Concrete, Plant Mix, Hot Laid.....	34
Recycled Asphalt Concrete, Plant Mix, Cold Laid.....	35
Recycled Asphalt Concrete, Mixed In-Place.....	36
Sand Asphalt.....	46
Cement-Aggregate Mixture.....	37
Lean Concrete (<3 sacks cement/cy).....	38
Recycled Portland Cement Concrete.....	39
Sand-Shell Mixture.....	40
Limerock, Caliche (Soft Carbonate Rock).....	41
Lime-Treated Subgrade Soil.....	42
Cement-Treated Subgrade Soil.....	43
Pozzolan-Aggregate Mixture.....	44
Cracked and Seated PCC Layer.....	45
Other.....	49

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Table A.7. Subgrade soil description codes.

<u>Soil Description</u>	<u>Code</u>
Fine-Grained Subgrade Soils:	
Clay (Liquid Limit >50).....	51
Sandy Clay.....	52
Silty Clay.....	53
Silt.....	54
Sandy Silt.....	55
Clayey Silt.....	56
Coarse-Grained Subgrade Soils:	
Sand.....	57
Poorly Graded Sand.....	58
Silty Sand.....	59
Clayey Sand.....	60
Gravel.....	61
Poorly Graded Gravel.....	62
Clayey Gravel.....	63
Shale.....	64
Rock.....	65

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Table A.8. Material type codes for thin seals and interlayers.

	<u>Code</u>
Chip Seal Coat.....	71
Slurry Seal Coat.....	72
Fog Seal Coat.....	73
Woven Geotextile.....	74
Nonwoven Geotextile.....	75
Stress Absorbing Membrane Interlayer.....	77
Dense Graded Asphalt Concrete Interlayer.....	78
Aggregate Interlayer.....	79
Open Graded Asphalt Concrete Interlayer.....	80
Chip Seal With Modified Binder (Does Not Include Crumb Rubber).....	81
Sand Seal.....	82
Asphalt-Rubber Seal Coat (Stress Absorbing Membrane).....	83
Sand Asphalt.....	84
Other.....	85

Table A.9. Geologic classification codes.

<u>Igneous:</u>	<u>Code</u>
Granite.....	01
Syenite.....	02
Diorite.....	03
Gabbro.....	04
Peridotite.....	05
Felsite.....	06
Basalt.....	07
Diabase.....	08
 <u>Sedimentary:</u>	
Limestone.....	09
Dolomite.....	10
Shale.....	11
Sandstone.....	12
Chert.....	13
Conglomerate.....	14
Breccia.....	15
 <u>Metamorphic:</u>	
Gneiss.....	16
Schist.....	17
Amphibolite.....	18
Slate.....	19
Quartzite.....	20
Marble.....	21
Serpentine	22

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Table A.10. Soil and soil-aggregate mixture type codes,
AASHTO classification.

	<u>Code</u>
A-1-a.....	01
A-1-b.....	02
A-3.....	03
A-2-4.....	04
A-2-5.....	05
A-2-6.....	06
A-2-7.....	07
A-4.....	08
A-5.....	09
A-6.....	10
A-7-5.....	11
A-7-6.....	12

Table A.11 Portland Cement Type Codes

	<u>Code</u>
Type I	41
Type II	42
Type III	43
Type IV	44
Type V	45
Type IS	46
Type ISA	47
Type IA	48
Type IIA	49
Type IIIA	50
Type IP	51
Type IPA	52
Type N	53
Type NA	54
Other	55

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Table A.12 Portland Cement Concrete Admixture Codes

	<u>Code</u>
Water-Reducing (AASHTO M194, Type A)	01
Retarding (AASHTO M194, Type B)	02
Accelerating (AASHTO M194, Type C)	03
Water-Reducing and Retarding (AASHTO M194, Type D)	04
Water-Reducing and Accelerating (AASHTO M194, Type E)	05
Water-Reducing, High Range (AASHTO M194, Type F)	06
Water-Reducing, High Range and Retarding (AASHTO M194, Type G) ...	07
Air-Entraining Admixture (AASHTO M154)	08
Natural Pozzolans (AASHTO M295, Class N)	09
Fly Ash, Class F (AASHTO M295)	10
Fly Ash, Class C (AASHTO M295)	11
Other (Chemical)	12
Other (Mineral)	13

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Table A.13. Aggregate durability test type codes.

<u>Description</u>	<u>AASHTO</u>	<u>ASTM</u>	<u>Code</u>
Resistance to Abrasion of Small Size Coarse Aggregate by Use of Los Angeles Machine (Percent Weight Loss)	T96	C131	01
Soundness of Aggregate by Freezing and Thawing (Percent Weight Loss)	T103	--	02
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate (Percent Weight Loss)	T104	C88	03
Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (Percent Weight Loss)	--	C535	04
Potential Volume Change of Cement-Aggregate Combinations (Percent Expansion)	--	C342	05
Evaluation of Frost Resistance of Coarse Aggregates in Air-Entrained Concrete by Critical Dilution Procedures (Number of Weeks of Frost Immunity)		C682	06
Potential Alkali Reactivity of Cement Aggregate Combinations (Average Percent Expansion)	--	C227	07
Potential Reactivity of Aggregates (Reduction in Alkalinity-mmol/L)	--	C289	08
Test for Clay Lumps and Friable Particles in Aggregates (Percent by Weight)	T112	C142	09
Test for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Percent Change in Speciment Length)	--	C586.....	11

Table A.14. Codes for Asphalt Refiners and Processors in the United States.*

	<u>Code</u>
Belcher Refining Co.--Mobile Bay, Alabama	78
Hunt Refining Company--Tuscaloosa, Alabama	01
Chevron USA, Inc.--Kenai, Alaska	02
Mapco Alaska Petroleum--North Pole, Alaska	03
Intermountain Refining Cl.--Fredonia, Arizona.....	04
Berry Petroleum Company--Stevens, Arkansas	05
Cross Oil and Refining Company--Smackover, Arkansas	06
Lion Oil Company--El Dorado, Arkansas	07
McMillan Ring, Free Oil Cl.--Norphlet, Arkansas	08
Chevron USA, Inc.--Richmond, California	09
Conoco, Inc.--Santa Maria, California	10
Edgington Oil Co., Inc.--Long Beach, California	11
Golden Bear Division, Witco Chemical Corp.--Oildale, California	12
Golden West Refining, Co.--Santa Fe Springs, California	13
Huntway Refining Co.--Benicia, California	14
Huntway Refining Co.--Wilmington, California	15
Lunday-Thagard Co.--South Gate, California	79
Newhall Refining Co., Inc.--Newhall, California	16
Oxnard Refining--Oxnard, California	17
Paramount Petroleum Corp.--Paramount, California	80
Powerline Oil Co.--Santa Fe Springs, California	81
San Joaquin Refining Cl.--Bakersfield, California	18
Shell Oil Co.--Martinez, California	19
Superior Processing Co.--Santa Fe Springs, California	20
Colorado Refining Co.--Commerce City, Colorado	82
Conoco, Inc.--Commerce City, Colorado	21
Amoco Oil Co.--Savannah, Georgia	22
Young Refining Corp.--Douglasville, Georgia	23
Chevron USA--Barber's Point, Hawaii	24
Clark Oil and Refining Corp.--Blue Island, Illinois	25
Shell Oil Co.--Wood River, Illinois	26
Unacol Corp.--Lemont, Illinois	27
Amoco Oil Co.--Whiting, Indiana	28
Laketon Refining Corp.--Laketon, Indiana	83
Young Refining Corp.--Laketon, Indiana	29
Derby Refining Co.--El Dorado, Kansas	84
Farmland Industries, Inc.--Phillipsburg, Kansas	30
Total Petroleum, Inc.--Arkansas City, Kansas	31
Ashland Petroleum Co.--Catlettsburg, Kentucky	32
Atlas Processing Co.--Shreveport, Louisiana	33
Calumet Refining Co.--Princeton, Louisiana	34
Exxon Co.--Baton Rouge, Louisiana	35
Marathon Petroleum Co.--Garyville, Louisiana	36
Marathon Petroleum Co.--Detroit, Michigan	37
Ashland Petroleum Co.--St. Paul, Minnesota	38
Koch Refining Co.--Rosemount, Minnesota	39
Chevron USA, Inc.--Pascagoula, Mississippi	40
Ergon Refining Inc.--Vicksburg, Mississippi	41
Southland Oil Co.--Lumberton, Mississippi	42
Southland Oil Co.--Sanderson, Mississippi	43

Table A.14. Codes for Asphalt Refiners and Processors in the United States
(Continued).*

	<u>Code</u>
Cenex--Laurel, Montana	44
Conoco, Inc.--Billings, Montana	45
Exxon Co.--Billings, Montana	46
Chevron USA, Inc.--Perth Amboy, New Jersey	47
Exxon Co., Linden, New Jersey	48
Giant Industries, Inc.--Gallup, New Mexico	85
Navahoe Refining Co.--Artesia, New Mexico	49
Cibro Petroleum Products Co.--Albany, New York	86
Ashland Petroleum Co.--Canton, Ohio	50
Standard Oil Co.--Toledo, Ohio	51
Sohio Oil Co (BP America)--Toledo, Ohio	87
Kerr-McGee Refining Co.--Wynnewood, Oklahoma	52
Sinclair Oil Corp.--Tulsa, Oklahoma	53
Sun Co. Inc.--Tulsa, Oklahoma	54
Total Petroleum Inc.--Ardmore, Oklahoma	55
Chevron USA, Inc.--Portland, Oregon	56
Atlantic Refining & Marketing Corp.--Philadelphia, PA	57
United Refining Co.--Warren, Pennsylvania	58
Mapco Petroleum Inc.--Memphis, Tennessee	59
Charter International Oil Co.--Houston, Texas	60
Chevron USA, Inc.--El Paso, Texas	61
Coastal Refining & Marketing, Inc.--Corpus Christi, Texas	88
Coastal States Petroleum Co.--Corpus Christi, Texas	62
Diamond Shamrock Corp.--Sunray, Texas	63
Exxon Co. USA--Baytown, Texas	64
Fina Oil and Chemical Co.--Big Spring, Texas	65
Fina Oil and Chemical Co.--Port Arthur, Texas	89
Hill Petroleum Co.--Houston, Texas	90
Shell Oil Co.--Deer Park, Texas	66
Star Enterprise--Port Arthur & Port Neches, Texas	91
Texaco Refining & Marketing Inc.--Port Arthur & Port Neches, Texas	67
Trifinery--Corpus Christi, Texas	92
Unocal Corp.--Nederland, Texas	68
Valero Refining Co.--Corpus Christi, Texas	69
Phillips 66 Co.--Woods Cross, Utah	70
Chevron USA Inc.--Seattle, Washington	71
Sound Refining, Inc.--Tacoma, Washington	72
US Oil and Refining Co.--Tacoma, Washington	73
Murphy Oil USA, Inc.--Superior, Wisconsin	74
Big West Oil Co.--Cheyenne, Wyoming	75
Little America Refining Co.--Casper, Wyoming	93
Sinclair Oil Corp.--Sinclair, Wyoming	76
Other	77

* Taken from Oil and Gas Journal, March 20, 1989, pp. 72-89.

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Table A.15 Asphalt Cement Modifier Codes

	<u>Code</u>
Stone Dust.....	01
Lime.....	02
Portland Cement.....	03
Carbon Black.....	04
Sulfur.....	05
Lignin.....	06
Natural Latex.....	07
Synthetic Latex.....	08
Block Copolymer.....	09
Reclaimed Rubber.....	10
Polyethylene.....	11
Polypropylene.....	12
Ethylene-Vinyl Acetate.....	13
Polyvinyl Chloride.....	14
Asbestos.....	15
Rock Wool.....	16
Polyester.....	17
Manganese.....	18
Other Mineral Salts.....	19
Lead Compounds.....	20
Carbon.....	21
Calcium Salts.....	22
Recycling Agents.....	23
Rejuvenating Oils.....	24
Amines.....	25
Fly Ash.....	26
Other.....	27

Table A.16 Grades of Asphalt, Emulsified Asphalt, and
Cutback Asphalt Codes

	<u>Code</u>
Asphalt Cements	
AC-2.5	01
AC-5	02
AC-10	03
AC-20	04
AC-30	05
AC-40	06
AR-1000 (AR-10 by AASHTO Designation)	07
AR-2000 (AR-20 by AASHTO Designation)	08
AR-4000 (AR-40 by AASHTO Designation)	09
AR-8000 (AR-80 by AASHTO Designation)	10
AR-16000 (AR-160 by AASHTO Designation)	11
200-300 pen	12
120-150 pen	13
85-100 pen	14
60-70 pen	15
40-50 pen	16
Other Asphalt Cement Grade	17
Emulsified Asphalts	
RS-1	18
RS-2	19
MS-1	20
MS-2	21
MS-2h	22
HFMS-1	23
HFMS-2	24
HFMS-2h	25
HFMS-2s	26
SS-1	27
SS-1h	28
CRS-1	29
CRS-2	30
CMS-2	31
CMS-2h	32
CSS-1	33
CSS-1h	34
Other Emulsified Asphalt Grade	35
Cutback Asphalts (RC, MC, SC)	
30 (MC only)	36
70	37
250	38
800	39
3000	40
Other Cutback Asphalt Grade	99

Taken from MS-5, "A Brief Introduction to Asphalt," and Specification Series No. 2 (SS-2), "Specifications for Paving and Industrial Asphalts," both publications by the Asphalt Institute.

Table A.17 Maintenance and Rehabilitation Work Type Codes

	<u>Code</u>
Crack Sealing (linear ft.)	01
Transverse Joint Sealing (linear ft.)	02
Lane-Shoulder, Longitudinal Joint Sealing (linear ft.)	03
Full Depth Joint Repair Patching of PCC (sq. yards)	04
Full Depth Patching of PCC Pavement Other than at Joint (sq. yards)	05
Partial Depth Patching of PCC Pavement Other than at Joint (sq. yards)	06
PCC Slab Replacement (sq. yards)	07
PCC Shoulder Restoration (sq. yards)	08
PCC Shoulder Replacement (sq. yards)	09
AC Shoulder Restoration (sq. yards)	10
AC Shoulder Replacement (sq. yards)	11
Grinding/Milling Surface (sq. yards)	12
Grooving Surface (sq. yards)	13
Pressure Grout Subsealing (no. of holes)	14
Slab Jacking Depressions (no. of depressions)	15
Asphalt Subsealing (no. of holes)	16
Spreading of Sand or Aggregate (sq. yards)	17
Reconstruction (Removal and Replacement) (sq. yards)	18
Asphalt Concrete Overlay (sq. yards)	19
Portland Cement Concrete Overlay (sq. yards)	20
Mechanical Premix Patch (using motor grader and roller) (sq. yards)	21
Manual Premix Spot Patch (hand spreading and compacting with roller) (sq. yards)	22
Machine Premix Patch (placing premix with paver, compacting with roller) (sq. yards)	23
Full Depth Patch of AC Pavement (removing damaged material, repairing supporting material, and repairing) (sq. yards) ...	24
Patch Pot Holes - Hand Spread, Compacted with Truck (no. of holes)	25
Skin Patching (hand tools/hot pot to apply liquid asphalt and aggregate) (sq. yards)	26
Strip Patching (using spreader and distributor to apply hot liquid asphalt and aggregate) (sq. yards)	27
Surface Treatment, single layer (sq. yards)	28
Surface Treatment, double layer (sq. yards)	29
Surface Treatment, three or more layers (sq. yards)	30
Aggregate Seal Coat (sq. yards)	31
Sand Seal Coat (sq. yards)	32
Slurry Seal Coat (sq. yards)	33
Fog Seal Coat (sq. yards)	34
Prime Coat (sq. yards)	35
Tack Coat (sq. yards)	36
Dust Layering (sq. yards)	37
Longitudinal Subdrains (linear feet)	38
Transverse Subdrainage (linear feet)	39

Table A.17 Maintenance and Rehabilitation Work Type Codes
(continued)

	<u>Code</u>
Drainage Blankets (sq. yards)	40
Well System	41
Drainage Blankets with Longitudinal Drains	42
Hot-Mix Recycled Asphalt Concrete (sq. yards)	43
Cold-Mix Recycled Asphalt Concrete (sq. yards)	44
Heater Scarification, Surface Recycled Asphalt Concrete (sq. yards)	45
Crack and Seat PCC Pavement as Base for New AC Surface (sq. yards)	46
Crack and Seat PCC Pavement as Base for New PCC Surface (sq. yards)	47
Recycled Portland Cement Concrete (sq. yards)	48
Pressure Relief Joints in PCC Pavements (linear feet)	49
Joint Load Transfer Restoration in PCC Pavements (linear feet) ...	50
Mill Off Existing Pavement and Overlay with AC (sq. yards)	51
Mill Off Existing Pavement and Overlay with PCC (sq. yards)	52
Other	53
Partial Depth Patching of PCC Pavement at Joints (sq. yards)	54

Table A.18. Maintenance location codes.

	<u>Code</u>
Outside Lane (Number 1)	01
Inside Lane (Number 2)	02
Inside Lane (Number 3)	03
All Lanes	09
Shoulder	04
All Lanes Plus Shoulder	10
Curb and Gutter	05
Side Ditch	06
Culvert	07
Other	08

Note: SHRP LTPP only studies outside lanes.

Table A.19 Maintenance Materials Type Codes

	<u>Code</u>
Preformed Joint Fillers	01
Hot-Poured Joint and Crack Sealer	02
Cold-Poured Joint and Crack Sealer	03
Open Graded Asphalt Concrete	04
Hot Mix Asphalt Concrete Laid Hot	05
Hot Mix Asphalt Concrete Laid Cold	06
Sand Asphalt	07
Portland Cement Concrete (overlay or replacement)	
Joint Plain (JPCP)	08
Joint Reinforced (JRCP)	09
Continuously Reinforced (CRCP)	10
Portland Cement Concrete (Patches)	11
Hot Liquid Asphalt and Aggregate (Seal Coat)	12
Hot Liquid Asphalt and Mineral Aggregate	13
Hot Liquid Asphalt and Sand	14
Emulsified Asphalt and Aggregate (Seal Coat)	15
Emulsified Asphalt and Mineral Aggregate	16
Emulsified Asphalt and Sand	17
Hot Liquid Asphalt	18
Emulsified Asphalt	19
Sand Cement (Using Portland Cement)	20
Lime Treated or Stabilized Materials	21
Cement Treated or Stabilized Materials	22
Cement Grout	23
Aggregate (Gravel, Crushed Stone or Slag)	24
Sand	25
Mineral Dust	26
Mineral Filler	27
Other	28

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Table A.20. Recycling agent type codes.

	<u>Code</u>
RA 1.....	42
RA 5.....	43
RA 25.....	44
RA 75.....	45
RA 250.....	46
RA 500.....	47
Other.....	48

Note: The recycling agent groups shown in this table are
defined in ASTM D4552.

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Table A.21. Anti-stripping agent type codes.

	<u>Code</u>
Permatac	01
Permatac Plus	02
Betascan Roads	03
Pavebond	04
Pavebond Special	05
Pavebond Plus	06
BA 2000	07
BA 2001	08
Unichem "A"	09
Unichem "B"	10
Unichem "C"	11
AquaShield AS4115	12
AquaShield AS4112	13
AquaShield AS4113	14
Portland Cement	15
Hydrated Lime:	
Mixed Dry With Asphalt Cement	16
Mixed Dry with Dry Aggregate	17
Mixed Dry with Wet Aggregate	18
Slurried Lime Mixed with Aggregate	19
Hot Lime Slurry (Quick Lime Slaked and Slurried at Job Site)	20
No Strip Chemicals A-500	21
No Strip Chemical Works ACRA RP-A	22
No Strip Chemical Works ACRA Super Conc.	23
No Strip Chemical Works ACRA 200	24
No Strip Chemical Works ACRA 300	25
No Strip Chemical Works ACRA 400	26
No Strip Chemical Works ACRA 500	27
No Strip Chemical Works ACRA 512	28
No Strip Chemical Works ACRA 600	29
Darakote	30
De Hydro H86C	31
Emery 17065	32
Emery 17319	33
Emery 17319 - 6880	34
Emery 17320	35
Emery 17321	36
Emery 17322	37
Emery 17339	38
Emery 1765-6860	39
Emery 6886B	40
Husky Anti-Strip	41
Indulin AS-Special	42

Table A.22 Distress Types

	<u>Code</u>
Asphalt Concrete Pavement	
Alligator Cracking	01
Block Cracking	02
Edge Cracking	03
Longitudinal Cracking	04
Reflection Cracking	05
Transverse Cracking	06
Patch Deterioration	07
Potholes	08
Rutting	09
Shoving	10
Bleeding	11
Polished Aggregate	12
Raveling and Weathering	13
Lane Shoulder Dropoff	14
Water Bleeding	15
Pumping	16
Other	17
Portland Cement Concrete Pavement	
Corner Breaks	20
Durability Cracking	21
Longitudinal Cracking	22
Transverse Cracking	23
Joint Seal Damage	24
Spalling	25
Map Cracking/Scaling	26
Polished Aggregate	27
Popouts	28
Punchouts	29
Blowouts	30
Faulting	31
Lane/Shoulder Dropoff	32
Lane/Shoulder Separation	33
Patch Deterioration	34
Water Bleeding/Pumping	35
Slab Settlement	36
Slab Upheaval	37
Other	38